DOCUMENT RESUME

ED 269 728 CS 008 415

AUTHOR	Miller, Gloria E.
TITLE	The Effects of Self-Instructions and Didactic Training on Fifth-graders' Detection of Errors in Prose Passages.
INSTITUTION	Wisconsin Center for Education Research, Madison.
SPONS AGENCY	National Inst. of Education (ED), Washington, DC.
PUB DATE	Sep 82
GRANT	NIE-G-81-0009
NOTE	223p.; Doctoral Dissertation, University of Wisconsin-Madison.
PUB TYPE	Reports - Research/Technical (143) -- Dissertations/Theses - Doctoral Dissertations (041)
EDRS PRICE	MF01/PC09 Plus Postage.
DESCRIPTORS	Cognitive Development; Comparative Analysis; Grade 5; *Independent Study; Intermediate Grades; *Metacognition; Reading Ability; *Reading Comprehension; Reading Improvement; Reading Instruction; *Reading Processes; *Reading Research; *Teaching Methods; Training Methods
IDENTIFIERS	*Comprehension Monitoring; Didactic Teaching

ABSTRACT

A study was designed to improve fifth-graders' limited use of comprehension monitoring processes during reading through a self-instructional approach. Thirty-nine average and superior comprehenders were tested on their ability to detect inconsistencies contained in short essays prior to, immediately after, and one week after participation in one of three instructional groups: a teacher-directed didactic control group, a neutral self-instruction group, and a specific self-instruction group. Children in the didactic control group received the same instructional content as children in the neutral self-instruction group, but without active rehearsal. In addition to the active rehearsal components, the specific self-instruction group received self-statements specifying an optimal task criterion. Within each ability level, planned contrasts were made among students' immediate and delayed performances across the three instructional groups. Immediately after training, the average comprehenders displayed equivalent improvement across all groups while the superior comprehenders in the specific self-instruction group improved significantly more in detecting errors than did the didactic control group. One week later, no improvement differences were noted between the groups for either ability level. Superior comprehenders displayed significantly greater improvements than the average comprehenders only immediately after receiving the specific self-instruction. Although the superior comprehenders detected more text errors than the average comprehenders, the patterns of improvement following instruction were similar in all the remaining between-ability comparisons. (Author/HOD)

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ED269728

The Effects of Self-Instructions and Didactic Training on Fifth-graders' Detection of Errors in Prose Passages

by Gloria E. Miller

CS008415

September 1982

Wisconsin Center for Education Research
an institute for the study of diversity in schooling

THE EFFECTS OF SELF-INSTRUCTIONS AND DIDACTIC TRAINING ON FIFTH-GRADERS' DETECTION OF ERRORS IN PROSE PASSAGES

by

Gloria E. Miller

Doctoral Dissertation from
The Program on Student Diversity and School Processes

Wisconsin Center for Education Research
The University of Wisconsin
Madison, Wisconsin

September 1982

This doctoral dissertation reports research supported by the Wisconsin Center for Education Research. Since it has been approved by a University Examining Committee, it has not been reviewed by the Center. It is published by the Center as a record of some of the Center's activities and as a service to the student. The bound original is in the University of Wisconsin Memorial Library.

The project reported herein was performed pursuant to a grant from the National Institute of Education (Grant No. NIE-G-81-0009). However, the opinions expressed herein do not necessarily reflect the position or policy of the National Institute of Education, and no official endorsement by the National Institute of Education should be inferred.

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The Wisconsin Center for Education Research is a noninstructional department of the University of Wisconsin-Madison School of Education. The Center is supported primarily with funds from the National Institute of Education.

Acknowledgements

As far as acknowledgements go, I had hoped to be able to express my gratitude towards the people who have significantly influenced my life here at Wisconsin. But, I have found that the perfunctory provision of an acknowledgement cannot even begin to tap my sincere appreciation. Thus, I have opted for brevity with hopes of finding additional means of expressing my feelings and admiration.

First, a special thank you is extended to Dr. Steven R. Yussen for his inspirational and challenging advising and continued support. A thank you to Dr. Joel R. Levin for "getting-me-started" and for sharing his invaluable knowledge of educational research. A thank you to Dr. William Reynolds for his many words-of-wisdom, encouragement, and friendship. A thank you to Dr. Maribeth Gettinger for her eternal optimism and for providing an exceptionally fine role-model of a professional woman. A thank you to Dr. Richard R. Smith for his creative insights and generous contributions of time. My special gratitude is also extended to Louise Smalley, Karen Rembold, and Mary Moskoff who have provided such wonderful friendship. I also want to acknowledge and thank my mother whose encouragement and faith have always kept me going. Finally, I thank my husband, Joseph, whose presence in my life has added more depth, joy, and love than I ever imagined possible.

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THE EFFECTS OF SELF-INSTRUCTIONS AND DIDACTIC TRAINING ON FIFTH-GRADERS' DETECTION OF ERRORS IN PROSE PASSAGES

Gloria E. Miller

Under the supervision of Professor Steven R. Yussen

This study was designed to remediate fifth-grade readers limited use of comprehension monitoring processes during reading through a self-instructional approach. Thirty-nine average and superior comprehenders, identified on the basis of a standardized reading test, were tested on their ability to successfully detect inconsistencies contained in short essays, prior to, immediately after, and one week after serving in one of three instructional groups. The instructional groups were: a teacher directed didactic control group; a neutral self-instruction group; and a specific self-instruction group. Children in the didactic control groups received the same instructional content as children in the neutral self-instruction groups, but without active rehearsal. In addition to the active rehearsal components, the specific self-instruction groups received self-statements specifying an optimal task criterion. Within each ability level, planned contrasts were made among students' immediate and delayed performance gains across the three instructional groups. Immediately after training, the average comprehenders displayed equivalent improvement across all groups while the superior comprehenders in the specific self-instruction group improved significantly more in detecting errors than did the didactic control group. One week later, no improvement differences were noted between the groups for either ability level. Superior comprehenders displayed significantly greater improvements than the average comprehenders only immediately after receiving the specific self-instruction. Although the superior comprehenders detected more text errors than the average comprehenders, the patterns of improvement following instruction were similar in all remaining between ability comparisons.

Major Professor ______________________________

Chapter 1

Introduction

Metacognition

Research on cognitive development has recently begun to examine the importance of metacognition. Flavell (1978) was one of the first to distinguish between studying a cognitive process on the one hand versus studying a person's awareness and control of these processes on the other. Metacognition broadly conceived refers to the knowledge we have of our cognitive resources and the knowledge we have regarding the application of these resources during learning. Another view of metacognition is a "shared awareness about what you know about how you know" (Paris, 1978).

The monitoring and regulation of ongoing cognitive endeavors have been posed as the basic function of metacognition (Brown, 1978, 1980; Markman, 1981) and these metacognitive components have been incorporated into most recent definitions of intellectual capacity (Borkowski, in press; Campione & Brown, 1979; Sternberg, 1981). Metacognitive components of intelligence related to "an individual's understanding of how one's mind works, of what is easy to do and what is difficult, of how one would go about solving problems,...." (Ryan, Ledger, Short & Weed, 1982, p. 55). Examples of metacognition in action include: a recognition that one type of information is more difficult to remember than another; knowing when information is not being understood, and knowing when it would be beneficial to employ certain strategies to increase memory or comprehension. These processes are similar to what Gagné and Briggs (1974) refer to as "cognitive strategies" or skills involved in managing thinking behaviors.

Initial examinations concerning the role of metacognition were confined to situations involving memory (Flavell & Wellman, 1977). In recent years, more time and effort have been expended to examine the role that metacognition plays in the comprehension of acquired information. A major portion of this research has concentrated on the study of metacognition in situations involving the transmission and acquisition of oral messages such as communication situations (Asher, 1976, 1979; Patterson & Kister, 1981) and listening tasks (Cosgrove & Patterson, 1977, 1978; Markman, 1977).

More recently, researchers have begun to examine the relationship between metacognition and reading (Baker & Brown, in press; Yussen, Mathews, & Hiebert, 1982). The role of metacognition, also referred to as comprehension monitoring, has been defined by Ryan, et al. (1982) as the monitoring and regulation of one's own basic abilities (i.e., perceptual, motor, and memory abilities), acquired knowledge (i.e., language, decoding, spelling, and world knowledge), and voluntary strategies (i.e., purposeful actions) during the act of reading. The growing body of literature reviewing reading development suggests that the spontaneous employment of metacomprehension strategies may be a late developing skill (Brown, 1978, 1980). Moreover, employment of these skills may not be consistently evidenced with adult readers in all situations (Baker, 1979; Glenberg, Wilkinson, & Epstein, 1980).

The most striking evidence of the role metacognition plays in reading comprehension comes from the past research literature concerning unsuccessful readers who possess reasonably adequate decoding and vocabulary skills. The result of previous work involving less successful comprehenders has consistently provided evidence of ineffective and passive strategic behavior. Poor comprehenders often avoid strategic activities during reading, such as recognizing their failures to understand, integrating information across sentences, drawing inferences, attending to important information and incorporating prior knowledge (Kaufman, 1981; Owings, Peterson, Bransford, Morris, & Stein, 1980; Pace, 1980; Paris & Lindhauer, in press; Ryan, 1981). The passivity displayed by less successful comprehenders has recently been reinterpreted in terms of ineffective metacomprehension strategies, processes such as; prediction, planning, self-interrogation, self-testing, and monitoring ongoing attempts to understand (Brown, 1980; Wong, 1982).

Although many previous studies have elucidated various strategy performance differences between successful and less successful readers, not much is understood about whether less successful students are capable of learning to employ effective strategies. In particular, few studies to date have examined training procedures designed to increase less successful readers' employment of metacomprehension strategies. The results of past training studies, however, have certainly supported the idea that less capable learners can benefit from other strategy training such as visual imagery (Levin, 1973) and sentence elaboration (Bransford, Stein, Shelton, & Owings, 1980). Future research endeavors must attempt to investigate possible benefits associated with training metacognitive strategies.

One reason that less successful readers remain relatively passive in the employment of metacomprehension strategies is that they seem to lack the awareness that reading requires personal involvement with the text (Ryan, 1981; Singer, 1978). Support for this idea comes from one study which found that students who received an instructional approach emphasizing personal involvement with the text also showed a corresponding increase in their metacognitive awareness during reading (Short, 1981). One means of promoting increased involvement and active strategy employment is through self-instructional training. The cognitive behavior modification (CBM) approach developed by Meichenbaum and Goodman (1971) for remediating impulsive responding during perceptual motor tasks is a well-known application of self-instructional training.

The self-instructional approach typically follows a pattern in which the learner is taught a set of goal-directed self-statements. Practice with these self-statements proceeds systematically from an external modeling phase to a covert rehearsal phase. The goal is for the child to gain personal control over successful task performance. This training approach has not been employed frequently with academic tasks such as reading, but several studies have reported promising findings (Bommarito & Meichenbaum, 1978, cited in Meichenbaum & Asarnow, 1979; Day, 1980; Short & Ryan, in press). Others have pointed out that self-instructional training goes beyond didactic instruction by providing explicit guidelines in self-monitoring skills (Brown, Campione, & Day, 1981).

From the viewpoint of an educational psychologist, it is important to continue to investigate training designed to increase useful comprehension monitoring strategies. Specifically, future research endeavors must be directed toward investigations of self-instructional training procedures with academic tasks, such as reading. The present study was designed to illuminate three basic issues regarding the use of self-instructional training during reading. One purpose of this study was to investigate the potential of employing a self-instructional strategy to promote increased comprehension monitoring performances in young children during reading.

The second purpose of the study was to examine the benefits of two different levels of explicitness within a self-instructional format. Often training studies are designed to investigate one instructional manipulation rather than assessing different levels of training explicitness. Explicit instruction which supplies an appropriate standard to evaluate one's comprehension has resulted in improved error detection performances in older elementary school aged children (Markman & Gorin, 1981). In this study the evaluation criterion to be employed was either specified or not specified within the self-instructional format in order to determine if the benefits of self-instructional training increased when the evaluation criterion was made explicit.

The third purpose of this study was to assess the effect of each type of training with students designated as superior or average comprehenders. Two different reading levels were included to determine if self-instructional training was equally beneficial for both groups of children. Day (1980) has recently shown that more successful students derive greater benefits from training and may need less explicit strategy instruction than less successful students. Thus, the specificity of the training or the extent of the explicitness needed to bring about improvements in comprehension monitoring may differ across groups of students with varying levels of reading ability.

The fourth purpose of the study was to examine the maintenance of the trained strategy. Although previous work has demonstrated that changes in less successful learners' strategy utilization may be altered for short times, persistent long-term changes have not always been secured (Campione & Brown, 1977). Whether or not the beneficial effects of instruction go beyond the immediate training situation and training task is not only an important theoretical issue, but also a necessary requirement if educational recommendations are the eventual goal.

Thus, this study was designed to investigate the facilitative effects of self-instructional strategies upon children's comprehension monitoring performances during reading, to shed some light on the explicitness of the instruction needed to bring about improvement in different learners, and to examine the effectiveness of this training approach over time.

Chapter 2

Review of the Literature

Much of the past research concerning reading development has focused on the actual cognitive processes employed during reading. More recently, theorists have stressed the role of metacognition and have emphasized the importance of studying metacognitive aspects of reading (Baker & Brown, 1981; Baker & Brown, in press; Ryan, 1981; Yussen, Mathews, & Heibert, 1981). Metacognition as related to reading refers both to people's understanding of their knowledge about reading as well as their knowledge about how to control ongoing reading processes. Baker and Brown (1981) and Yussen, Mathews, and Heibert (1982) have further distinguished between these two aspects or clusters of knowledge; the former consisting of knowledge that is relatively static and removed from the ongoing reading activity and the latter consisting of knowledge that is more dynamic and integral to the ongoing comprehension process. The focus of the present study is on the latter aspect which includes an awareness of the self-regulatory mechanisms one can apply during reading.

Research investigating the relationship between metacognition and reading can be classified as dealing with one or another of these aspects (Winograd & Johnson, 1980). As one means of organizing this literature review, studies examining what people know about the task of reading will be briefly reviewed, followed by a more extensive review of studies examining the types of monitoring activities children engage in as they proceed towards efficient reading comprehension.

Metacognitive Knowledge and Reading

Examples of research investigating more static metacognitive knowledge include interview studies that assess children's awareness of certain task, strategy, and person variables related to reading (Forrest & Waller, 1979; Meyers & Paris, 1978). These variables were first proposed by Flavell and Wellman (1977) as important categories of metacognition that might help children to remember effectively. The literature related to both memory and reading development has shown that while adults and older children are often sensitive to these metacognitive variables, children younger than eight years of age are less sensitive.

Investigators have also examined the relationship between a student's reading performance and metacognitive knowledge associated with the act of reading. One interview study indicated that poor readers did not share the same perception of the purpose of reading (Canney & Winograd, 1979) as did good readers. Pace (1978) found a significant correlation between a student's comprehension score and responses to interview questions which indicated a greater insight into the process of comprehension. In the same vein, other studies have looked at the relationship between reading ability and children's knowledge of important aspects of text (e.g., Brown & Smiley, 1977; Otto, Barrett, & Koenke, 1969; Stein & Glenn, 1979) and children's views of what constitutes a word or sentence (Allan, 1979; Downing, 1971-1972; Downing & Oliver, 1973-1974; Hiebert, 1981). The results of past work indicate that there may be an important relationship between a child's understanding of the concepts, skills, and purposes of reading and reading performance.

Comprehension Monitoring and Reading

The focus of this "dissertation" review is on the dynamic component of metacognition-comprehension monitoring. This aspect of metacognition involves the ability to use self-regulatory mechanisms such as checking, planning, evaluating, and revising one's strategies for learning (Baker & Brown, in press). The use of these regulatory mechanisms is known as cognitive monitoring (Flavell, 1981). When all of the major cognitive activities are focused on the goal of successful comprehension, the term cognitive monitoring is more appropriately relabeled as comprehension monitoring (Baker & Brown, in press). Comprehension monitoring during reading entails keeping track of the success with which one's comprehension is proceeding (e.g., monitoring) and taking remedial actions if comprehension progress is hindered (e.g., regulating) (Baker, 1979).

Ongoing monitoring attempts are comprised of the sensations and cognitions people experience while pursuing the goal of comprehension and include a person's recognition of comprehension failures. Evidence of comprehension monitoring has been sought through assessments of a person's reaction to a deliberate disruption placed in a message. Typically people are asked to read or listen to texts containing confusing elements or embedded errors. Various methodologies are then used to examine the effects of such confusions on the learner's subsequent ability to report problems and on processing behaviors evidenced during reading.

One methodology employed in past research assesses a person's awareness of an embedded error through a structured interview in which the person's score became the number of probes it took to notice the error. Evidence of successful comprehension monitoring would be reflected in a low score (Markman, 1977, 1979; Winograd & Johnson, 1980). In other studies people were asked to rate a passage's sensibility or rate the certainty with which they answered a comprehension question (Forrest & Waller, 1979). Problems associated with these error awareness procedures are based on the subjective nature and statistical drawbacks of the measures (Winograd & Johnson, 1980).

Other investigations have employed objective detection indices where a person may be asked to identify the placement of the error, briefly explain the error found, or respond to questions that are unanswerable due to the confusing information (Baker, 1979; Baker & Anderson, 1982; Forrest-Pressley, 1982; Kaufman, 1981; Markman & Gorin, 1981). Problems associated with the detection technique include: a lack of correspondence between what people say and do in particular situations, limited knowledge of actual ongoing processes during reading, and, if extensive explanations are required, an overreliance on a person's verbal abilities. (Baker, 1982a).

Evidence of spontaneous monitoring during comprehension has also been sought in the absence of verbal reports through observations of nonverbal behaviors that might signify confusion or puzzlement (Flavell, Speer, Green, & August, 1980) or by assessments of processing behaviors such as visual scanning and reading times (Baker & Anderson, 1982; Harris, Kruithof, Terwogt, & Visser, 1981). The on-line or nonverbal measures can be criticized, however, because they may be too removed from actual comprehension processes (Baker & Brown, in press). That is, changes in physical responses (i.e., longer reading times) may not directly reflect corresponding changes in metacomprehension or comprehension processes.

Another aspect of comprehension monitoring is the ability to take remedial actions to ensure appropriate comprehension. Regulatory strategies include conscious and unconscous attempts to successfully remediate instances of misunderstanding or improve certain aspects of comprehension. Evidence of these strategies has been sought through behavioral indices of self-regulation or planful activities.

One methodology used to investigate young children's ability to regulate their listening skills is referred to as the referential communication paradigm. Direct evidence of a child's regulatory strategies during some communicative encounter is obtained. Typically a speaker is asked to transmit some specific information to a listener (e.g., usually a description of a referent object or picture). The adequacy of the message is varied. In order to complete the task or choose the appropriate target the listener must discriminate between informative and uninformative messages. A request for clarification is taken as an indication of successful comprehension regulation (Cosgrove & Patterson, 1977; Donahue, Pearl, & Bryant, 1980; Katsonis & Patterson, 1980; Patterson, Massad, & Cosgrove, 1978; Patterson, O'Brien, Kister, Carter, & Katsonis, 1981).

Successful regulation strategies have been investigated with reading tasks as well. One technique involves an examination of a child's spontaneous correction of oral reading errors (Beebe, 1980; Isakson & Miller, 1976; Kavale & Schreiner, 1979; Miller & Isakson, 1978; Weber, 1970). Another technique is to observe children's tendencies to relisten or reread material in order to correct comprehension errors or clarify answers to comprehension questions

(Garner, 1980; Garner & Reis, 1981; Pace, 1976). Evidence of regulatory strategies has also been investigated using a cloze technique to assess a readers' use of contextual information (DiVesta, Hayward, & Orlando, 1979). Other approaches have addressed readers' abilities to regulate their level of comprehension by assessing the time spent reading more difficult texts (Owings, Peterson, Bransford, Morris, & Stein, 1980), by assessing readers' ability to predict their readiness for a test (Brown, Campione, & Barclay, 1979), and by assessing readers' ability to select suitable retrieval cues for studying texts (Brown, Smiley, & Lawton, 1978).

In the remainder of this review, studies will be presented which reveal the development of comprehension monitoring. The focus will be on studies which consider means of improving these skills in children. As one means of organizing the review, work emphasizing age or developmental differences in comprehension monitoring abilities will be reviewed first, followed by work emphasizing ability differences in comprehension monitoring. The final section will review applications of self-instructional training and current issues surrounding instructional research.

Throughout the review an effort was made to specify the student characteristics for each study. It should be noted, however, that the means of classifying subjects varies tremendously across studies. For example, in the developmental literature the adjective "young" has been applied to students ranging in age from two- to twelve-years-old. The problem of subject heterogeneity is especially apparent across studies investigating ability differences in comprehension monitoring. "Poor reader" classifications are derived in numerous ways, including; subjective teacher ratings, placements in classroom reading groups, intellectual assessments, achievement tests, and standardized reading tests. These divergent classification procedures are frequently compounded by arbitrary references to the student samples, making the summarization of findings across studies an unwieldy task. Thus, conclusions drawn from the literature investigating ability differences in comprehension monitoring must be made with caution and with the knowledge that a homogeneous population of "poor readers" does not exist.

Developmental Differences in Comprehension Monitoring

Markman (1977) conducted one of the earliest studies investigating children's ability to evaluate their understanding. Children in first through third grade listened to simple instructions on how to play a card game or perform a magic trick. Each set of instructions omitted information essential to performance of the task. The intent was to examine the point at which children asked clarifying questions thereby signaling their detection of the deficiencies in the instructions. Developmental differences were found in the children's employment of spontaneous monitoring. Third graders realized the inadequacies of the instructions significantly sooner than the first graders. The younger children needed to repeat or enact the instructions before they realized anything was wrong. Markman concluded that one reason the younger children did not notice their comprehension problems was that they failed to process the instructions actively or spontaneously.

In a similar vein, Cosgrove and Patterson (1977) examined young children's ability to regulate their understanding within a referential communication paradigm. Nursery school, kindergarten, second- and fourth-grade children were presented ambiguous messages regarding a referent to be selected. In experiment one, the fourth-grade children made more spontaneous requests for further information than did any of the younger children. Children younger than ten-years-old frequently failed to question the speaker or seek additional clarification. In a second experiment, a strategic instructional set was presented. All children received instruction with an active "plan" which stressed how to make a comparison and request more information. The performance of all but the nursery school children significantly improved. The results were taken as evidence that the young children did not take steps to spontaneously regulate their listening comprehension, but that remediation of this strategy was possible.

Patterson, Massad, and Cosgrove (1978) retested the effectiveness of "plan" training and assessed the component of training which accounted for the children's improved performances. The type of plan training given to younger (mean age 7-6 years) and older (mean age 9-6 years) children was systematically varied. In the Comparison Plan condition, children were specifically taught how to engage in comparison activities. This training guaranteed that a child would possess the actual process needed for recognizing ambiguity but did not promote any regulation strategy. On the other hand, children in the Action Plan condition were taught how and when to request additional clarification if messages were unclear. That is, children were given the regulatory strategy to use for the task.

The results indicated a main effect for the Action Plan training. Students at both age levels who were instructed with a regulatory strategy were more likely to request clarification when encountering ambiguous messages. The beneficial effect of training was sustained over a two week delay period. These results suggest that successful training of monitoring and regulatory strategies during communication tasks is possible and in some cases may even be more beneficial than training with task-specific skills.

One of the most extensive attempts to examine children's metacognitive abilities during communicative situations was a study by Flavell, Speer, Green, and August (1980). Kindergarten and first-grade children were given ambiguous instructions for a building task. A variety of observable measures were used to assess the development of children's cognitive monitoring abilities including, verbal and nonverbal indices, unobtrusive observations, and direct post-task question answering. These researchers were interested in a child's ability to detect message inadequacies (a monitoring process) but they were also interested in the child's ability to understand the implication of the inadequacies they did detect (a regulatory process).

Briefly the results corroborated past findings suggesting that the ability to monitor and regulate one's comprehension develops with age. The older children (9-10 year-olds) spontaneously detected more errors than younger children (4-6 year-olds) and understood the meaning and implications of comprehension problems. That is, they were more likely to acknowledge that their comprehension difficulties would not be resolved without some purposeful regulatory action (e.g., asking questions). No attempt was made to train these skills in the younger students.

Markman (1977) hypothesized that one reason for young children's poor monitoring and regulating performance on communication tasks was their relative lack of spontaneous cognitive processing. Patterson, O'Brien, Kister, Carter, and Katsonis (1981) sought support for this hypothesis. These researchers reasoned that if a lack of spontaneous processing was the cause of poor performances then children should display improved comprehension monitoring performances when the processing demands associated with a task were reduced. A procedure was devised which systematically varied the processing demands of two task dimensions: stimulus complexity and message relevancy. That is, the complexity of the stimulus used in the task varied in terms of the number of potential referents a child had to choose from and the speaker varied the amount of information contained in the message. After receiving the speaker's cue, kindergarten, second-, and fourth-grade children were asked to judge whether they could make a confident choice among the referents. The child's judgment about whether there was enough information to identify the target referent was used as the primary dependent measure.

The results supported their hypothesis. A child's monitoring and regulating competence was significantly affected by the processing characteristics of the task situation. When the task demands were high (e.g., ambiguous messages or complex referent arrays given) fourth-grade children always outperformed the second-grade and kindergarten children. However, when the task processing demands were lowered even the youngest children judged effectively. A second experiment replicated these results. These researchers concluded that young children did show considerable skill in monitoring and regulating their own comprehension when limited processing was required for task completion, which lent support to the idea that children's success at employing metacognitive skills was influenced by the amount of spontaneous cognitive processing they imposed.

Thus, it appears that both the age of the child and the complexity of the task affect the likelihood of spontaneous employment of metacognitive strategies within communicative situations. On relatively simple communication tasks, rudimentary self-regulatory skills have been evidenced in children as young as two years old (Brown & DeLoache, 1978; DeLoache & Brown, 1979), but during more complex communication tasks, such as in understanding instructions, it appears that young children often fail to display spontaneous monitoring or regulation strategies. Older children (9 years of age and older) are more likely to employ and recognize the need for these strategies spontaneously. Younger children do demonstrate greater performances when the task demands are lowered, when they are forced to process information mentally, or when given training in how and when to apply regulatory strategies. A more extensive review of the referential communication literature can be found in Patterson and Kistner (1981).

On tasks requiring more complex mental processing such as the comprehension of texts, application of monitoring and regulating strategies may not be evidenced until later in the school years. In addition, the type of training necessary to elicit these strategies may take on new dimensions. Evidence to support these ideas can be found in studies involving reading related tasks.

Markman (1979) reasoned that monitoring one's comprehension of text would be more difficult than monitoring one's understanding of oral instructions because the criteria for successful comprehension are less explicit in a reading task and because readers must select their own standards for evaluating their comprehension. She also questioned whether the processing requirements associated with the task would affect performances. Children in third-, fifth-, and sixth-grade listened to short text passages that contained inconsistent information. The inconsistent information was either explicitly or implicitly presented (i.e., required more complex inferential reasoning). The children were asked a structured series of questions to assess their awareness of the two types of inconsistencies. The results demonstrated that students at all ages had great difficulty detecting contradictory information when inferences were required to discover the error (e.g., 96% missed all or one of the implicit problems), though children's performances improved in the explicit error condition (e.g., 40-50% of the students did not notice the inconsistencies). Efforts were made to rule out the possibility that this lack of metacognitive awareness was due to memory loss, an inability to draw appropriate logical inferences, or the reluctance to question the examiner.

In experiment three, Markman tested the idea that the nature of the standard one chooses to monitor comprehension will affect subsequent performances. Some children were given an evaluation standard to use during comprehension. The children were warned to expect something tricky as part of the instructions preceding the task. A greater proportion of the children who received this instructional set increased their subsequent error detection. This instructional manipulation, however, was of most benefit to the oldest (i.e., sixth-grade) students. Sixth graders were more likely to increase their monitoring performance when given an idea of the type of standard to use in evaluating their comprehension, this was true for detection of both the explicit and implicit errors.

The younger students who received the instructional set did change their monitoring strategies, but they appeared to be applying a different standard of evaluation. These students increased their tendency to question the truth of specific text information rather than comparing text information for its internal consistency. The propensity of young children to evaluate information with respect to what they already know has been evidenced in many other verbal comprehension situations, as well (Olson, 1977; Osherson & Markman, 1975).

Thus, it seems that a possible explanation for children's tendency to overlook inconsistencies may be that they do not spontaneously think to evaluate material for its logical consistency. While a brief and general explanation to expect something tricky was effective in improving older children's capacity to monitor for consistency, this was not the case for younger children who may need more explicit instructions on how to apply this complex evaluation criterion.

Pace (1978, 1980) found similar results by investigating young children's ability to employ regulatory strategies to enhance their understanding of stories. In her first study (Pace, 1978), kindergarten and second-grade children listened to a story about an uncommon situation (i.e., making lye soap) and then were asked various comprehension questions. The children received feedback on the accuracy of their answers and were then asked to think of ways to correct their errors. One simple means of assessing performance would be to relisten to the story. As was expected, the older children (age 7-8 years) were more likely to suggest a relistening strategy and were better able to improve their comprehension after relistening.

In a later study (Pace, 1980), children of the same ages were told that relistening could be used as a strategy to improve their comprehension and correct their performance. In this experiment, the processing level of the comprehension questions was varied as well. That is, the questions either assessed knowledge of information obtained within a sentence or knowledge that could be obtained from an integration of information across sentences. Children's tendency to use a relistening strategy and children's ability to correct comprehension errors after relistening were observed.

As before, second graders suggested a relistening strategy most often. In addition, the second-grade children were always better at correcting their performance but only on the within sentence comprehension questions. Neither second graders nor kindergartners were very successful at correcting errors that required integration of information across sentences. Pace attributed these results to the inadequate spontaneous processing abilities of young children and the various processing levels of the comprehension task.

It should be pointed out that when children were not expected to apply regulatory processes spontaneously (i.e., when they were told that relistening could be used as a strategy) even kindergartners corrected 38% of their errors as compared to a 48% correction rate for second graders. Thus, the youngest children showed an improvement in their performance when given general instructions about when and how to employ one type of regulatory strategy. But the general instructions were not enough to improve the performances of either the kindergarten or second graders when the processing demands of the task were more advanced (i.e., errors placed across sentences rather than within sentences). Children may not typically employ an 'across-sentence' evaluation criterion to assess comprehension and therefore may need more explicit instructions on how to apply this type of evaluation standard to assess comprehension.

Baker (1982a) has recently sought further support for the hypothesis that certain types of evaluation standards are more difficult for young children to apply than others. Previously, Baker (1979) suggested that there are three major classes of evaluation criteria. One type of standard is to evaluate one's understanding of all the individual word meanings. A second type of standard is to evaluate the text for external consistency (i.e., evaluating for truthfulness — "Is this true?"; "Can this really happen?"). A third type of standard is to evaluate the text for internal consistency (i.e., evaluating for logical relationships or contradictions -- "Does this make sense with the rest of the text?").

The purpose of the study was to explore the effectiveness with which children in grades one, three, and five applied each of the three evaluation criteria. Additionally, all children were given explicit instructions to find errors and were given minimal training (i.e., examples) with the three types of errors to find. Children either listened to or read nine 100-word passages containing the three types of mistakes. If a child missed a mistake, the passage was presented a second time. The experimenter identified the error for the child if it was not reported after the reexposure.

The results of the study replicated past developmental findings -- older children were better at evaluating their comprehension than younger children. The study also extended past work in two ways: 1) the inconsistency standard of evaluation was found to be the most difficult to apply for all age levels tested, and 2) even children in first grade successfully monitored very simple narrative passages for nonsense words, prior knowledge conflicts, and to a lesser extent, explicit between sentence contradictions when instructed to do so. Wimmer (1979) has similarly found that a majority of the four-year-old children and all of the six-year-old children in his study noticed prior knowledge deviations in a very familiar script-like story if they were warned that the deviations were there.

Further support for the conclusion that young children's monitoring abilities can be enhanced was obtained in a study by Markman and Gorin (1981). The purpose of the study was to determine whether children could learn to adjust their standards of evaluation through specific instructions about the type of problem to expect. The researchers manipulated students' expectations about what standard of evaluation to employ and the type of problem embedded in a text passage. Eight-year-old and ten-year-old children were trained (i.e., given brief examples) to look for falsehood errors -- violations of common prior knowledge, inconsistency errors -- two contradictory sentences, or just to look for problems. All children listened to expository (i.e., workbook-like) passages containing falsehoods, inconsistencies, and no errors. In each case, the last sentences of the passage created the problem.

A significant interaction of instruction with problem type was expected as evidence that children did attempt to adjust their standard of evaluation. The results supported this hypothesis. Children who were given the standard of evaluation instructions were aware of more errors than children simply told to find problems in the passages. Additionally, children found more inconsistencies than falsehoods when trained to find inconsistencies while this pattern reversed when children were trained to find falsehoods. Developmental differences emerged only in the two specific evaluation criteria training conditions where older children (10-years-old) outperformed the younger children (8-years-old).

It was noted, however, that even with the orienting instructions indicating the standard of evaluation to use, the children were by no means performing at ceiling. Apparently these evaluation criteria may be difficult for young children to apply with expository texts. This is not to say that these children are incapable of further improvements. Rather, more extensive training may be needed before improvements are seen.

The research discussed thus far has primarily revealed that the ability to monitor one's comprehension during reading is developing in young children. But one might ask do older competent readers always monitor their comprehension effectively? The results of some recent studies (Baker, 1979; Glenberg, Wilkinson, & Epstein, 1980) have shown that there is room for improvement in this skill even among college students.

Baker (1979) pursued this question by utilizing an error detection paradigm during a reading task. College students were asked to read expository passages that were disrupted in the middle paragraph by either a contradiction, ambiguity, or illogical connective. Students were not warned of the existence of these problems before reading (i.e., they were not given assistance in selecting an appropriate standard for evaluating comprehension). Students first answered discussion questions which focused on recall of the deficient sections of text. Then they were informed of the errors and were asked to pinpoint them. Finally, they were asked if the errors had been noticed during reading. A surprising 62% of the confusions were not detected and students claimed to have noticed less that 25% of the confusions during reading.

The older students' failures to report the disruptions may have been due to the employment of unsuitable standards of evaluation but other factors may also have contributed to their poor comprehension monitoring. That is, an investigation of the students' retrospective reports revealed that many students used "fix-up" strategies to resolve the apparent comprehension problems (i.e., made inferences to supplement the information, or gave alternative interpretations to the text). The results of a follow-up study lent further support, however, to the notion that even college student's can benefit when given assistance in setting the specific standards for evaluating their comprehension (Baker, Anderson, Standiford, & Radin, 1979 - reported in Baker & Brown, 1981).

The results of a study conducted by Glenberg, Wilkinson, and Epstein (1980) also revealed that an instructional set specifying the evaluation criteria to use during reading increased college students' ability to detect nonsense, contradictory, or incomplete ideas in essays about unfamiliar topics. In addition, these experiments manipulated the comprehension level at which an error was embedded. In the first experiment, students were not warned of any errors; they were told only to read for comprehension. The students read difficult technical passages that contained 'between-paragraph' errors. That is, the error could only be detected if one contrasted the information in a third paragraph to that of the two previous paragraphs. Over 90% of the students exhibited an "illusion of knowing" and said they fully understood all of the information in the passage.

In two subsequent experiments a more precise error detection methodology was used and two manipulations were introduced which led students to increase their detection of embedded errors. One manipulation was that the students were specifically told what types of errors to look for. The second manipulation varied the comprehension level at which the error was embedded. Errors were embedded so that one needed to refer between paragraphs or within the same paragraph to detect the problem. The proportion of students detecting both types of errors increased to almost 50% (Experiment 3).

When shorter passages were used (Experiment 4) the students' ability to detect problems within paragraphs rose to almost 80%. This was not the case for the between paragraph error detection, however. Thus, it appears that older students can successfully monitor their comprehension when given explicit prompts regarding the type of error to expect and when the task demands are limited to detection of within paragraph errors. Detection of errors between paragraphs may require more extensive training to elicit better performances.

Summary of Developmental Differences in Comprehension Monitoring

Past work has assessed children's and adults' ability to monitor and regulate comprehension processes during communication, listening, and reading tasks. Active comprehension monitoring includes feelings of noncomprehension and detection of failures to understand as well as active attempts to resolve comprehension obstacles.

The results of past work have consistently demonstrated age related increases in the application of these abilities in groups of normal learners. Younger children were not usually cognizant of the occasions when their comprehension was faulty and often demonstrated a limited awareness of when and how to use general regulatory strategies to improve comprehension. One must be careful not to paint a picture of an elementary school child as a deficient comprehension monitor since the results of past work emphasize the degree to which age, the nature of the task, and the instructional situation affect children's ability to monitor and regulate their comprehension processes. Young students' abilities to detect comprehension failure and apply successful regulatory strategies have been altered with training and task manipulations. Even adults displayed poor monitoring and regulating performances in certain situations and evidenced improvement in the utilization of these strategies.

Markman (1979, 1981) has hypothesized that there are two major factors which account for the likelihood that people will utilize comprehension monitoring strategies. She suggests that inefficient cognitive processing and/or inappropriate selections of evaluation criteria result in deficient comprehension monitoring performances.

Training or task manipulations influencing the cognitive processing factor were especially effective in increasing metacomprehension performances in young children. Young children were shown to benefit from general instructions to enhance their integrative processing (Markman, 1977, 1979), from instructions on when and how to apply regulatory strategies (Cosgrove & Patterson, 1977; Patterson, Massad, & Cosgrove, 1978), and from manipulations that lowered the processing demands associated with the task (Patterson, O'Brien, Kister, Carter, & Katsonis, 1981).

Young children have also increased their comprehension monitoring performances following instructions that provide a specific standard to evaluate their comprehension, but older students and adults seemed to benefit more than younger students from this approach especially when applied to expository texts or to narrative texts that contained errors involving more inferential processing (Baker & Brown, 1981; Glenberg, Wilkinson, & Epstein, 1980; Markman, 1979; Markman & Gorin, 1981). Furthermore, certain standard of evaluation criteria (i.e., detection of between sentence contradictions) which are applied successfully by adults (Baker & Anderson, 1982; Garner & Alexander, 1981) remain difficult for young children to apply when only brief instructions are given (Baker, 1981; Pace, 1980).

The implication of the past research with normal learners is that important improvements in children's monitoring and regulating of their understanding could be effected through careful instruction. Past instructional procedures, however, have not been discussed in much detail. Future research must identify the most beneficial aspects of training, must evaluate how much strategy training generalizes to new circumstances, and must determine whether the benefits of training are sustained over time.

Ability Differences in Comprehension Monitoring

The previous section reviewed the developmental literature concerning comprehension monitoring in normal learners. More recently the focus of metacognitive research has been on disabled learners specifically, those students displaying reading comprehension difficulties. Wong (1980) has stressed that a more refined understanding of children's reading difficulties hinges on recognition of their insufficient comprehension monitoring processes. Interview studies to assess students' metacognitive knowledge of reading have consistently demonstrated that less-skilled readers have limited print awareness and limited knowledge of the basic concepts, strategies, and purposes of reading (Forrest & Waller, 1979; Garner & Kraus, 1980; Huba & Kontos, 1982; Meyers & Paris, 1978). This review will focus on studies which have examined differences between skilled and less-skilled readers' abilities to monitor ongoing cognitive progress and apply appropriate regulatory strategies for efficient learning.

Two studies have investigated less-skilled readers' (i.e., learning disabled) abilities to evaluate their understanding of instructions using a referential communication paradigm (Donahue, Pearl, & Bryant, 1980; Katsonis & Patterson, 1980). In both studies, learning disabled children's responses were compared to the responses of normal children matched either on age or IQ. Learning disabled children appeared less sensitive to the inadequacy of the messages they received (Donahue, Pearl, & Bryant, 1980) and were less able to judge when they had received sufficient information to be able to play a game (Katsonis & Patterson, 1980). No attempts were made to improve these abilities during communicative situations.

Comprehension monitoring differences between readers of varying ability levels have also been found on tasks involving the comprehension of texts rather than oral instructions. Garner (1980) tested for skilled/less-skilled reader differences in monitoring abilities using an error awareness rating procedure. Good and poor readers (i.e., designated on the basis of teacher's ratings) were told to act as editors while reading expository passages. The children were asked to rate the comprehensibility of short segments of text containing no errors and text containing errors that violated the gist of the paragraph. The results indicated that good readers rated the disrupted portions of text as less easy to understand than the nondisrupted text while poor readers made little rating distinction across the different segments of text.

Winograd and Johnson (1980) similarly assessed sixth-grade good and poor readers' abilities to judge the comprehensibility of paragraphs containing information that conflicted with contextual coherence. The error awareness paradigm was employed. If a child did not spontaneously note an error, a structured interview was administered which consisted of a series of probe questions increasingly directed toward the error. The child's score was the number of probes it took to detect the error. The results indicated that good readers were aware of the anomolies much sooner than poor readers. These authors were surprised, however, at the large percentage of errors that went undetected even by good readers. This led them to conclude that the children's poor monitoring performances were an artifact of the numerous problems inherent in the error awareness methodology. On the other hand, the results of other studies employing alternative comprehension monitoring measures have continued to demonstrate disparities between good and poor readers' comprehension monitoring performance.

In a study by Owings, Peterson, Bransford, Morris, and Stein (1980) less abled fifth graders (i.e., classified on the basis of their low reading and match achievement test scores) displayed a lack of spontaneous monitoring and regulating during a reading comprehension task. Children's memory for story information was obtained from two kinds of stories. One story type was considered easy to learn because it contained readily understood subject predicate pairs and the other story type was considered hard to learn because it contained uncommon pairs. Evidence of poor monitoring abilities came from the fact that the less abled students displayed little awareness of the text characteristics that would make comprehension more difficult even though their memory for story information was affected by the story type. Moreover, less abled students displayed an inefficient regulation strategy when allotted unlimited study time. In contrast to the better students who spent more time with the difficult story, poorer students distributed their study time equally between the two story types.

DiVesta, Hayward, and Orlando (1979) investigated good and poor readers' ability to use subsequent parts of the text to facilitate comprehension. Passages were constructed in which sentences were disrupted by missing words. In order to supply the missing words, readers needed to refer to previous text or to subsequent text. Populations of good readers and poor readers (i.e., below the 50th percentile in the Iowa Test of Basic Skills) at high school (Exp. 1) and middle school (Exp. 2) participated in this study. As predicted, poorer readers performed less well when they were required to make use of subsequent context. The better readers performed equally well on both types of word omissions. These authors concluded that poorer readers were less aware of various means of remediating comprehension failures.

Observations of children's spontaneous self-correction of oral reading errors is another methodology used to investigate the development of comprehension monitoring strategies. Studies of oral reading errors have revealed differences between good and poor readers' sensitivity to language constraints in sentences. Weber (1970) first noted that good and poor first-grade readers differed in the extent to which they corrected grammatically inappropriate errors but not in the extent to which they corrected grammatically acceptable errors. The better readers corrected 85% of the errors which made the sentence ungrammatical but only 27% of the grammatically acceptable errors. The poorer readers corrected the two types of errors at an approximately equal rate (42% vs. 32%, respectively). In a similar vein, Isakson and Miller (1976) and Kavale and Schreiner (1979) found that below average comprehenders made more meaning distorted errors and were less likely to correct these errors than above average comprehenders of the same age level.

Garner and Reis (1981) investigated good and poor readers' spontaneous use of rereading (or looking back) as a regulatory strategy to resolve comprehension difficulties. It was hypothesized that poor readers would use fewer lookbacks to resolve comprehension obstacles. The comprehension obstacles in this case were two types of interspersed questions contained in a text. A lookback question required retrieval of information presented in an earlier segment. A non-lookback question did not require retrieval from earlier text segments for correct responses. The lookback behavior of good and poor junior high school readers (i.e., classified on the basis of a reading clinic test battery) was constrasted for each question type. The results indicated that there were no differences between the groups in the number of correct answers or in the amount of lookbacks produced in response to non-lookback questions, but on the lookback questions, differential ability effects were found. A greater percentage of the good readers showed documented lookback behavior as compared to poor readers (i.e., 30% as compared to only

92%). Thus, even a simple regulatory strategy such as rereading text to resolve comprehension problems was not evidenced in junior high school readers experiencing reading difficulties.

A directed underlining methodology, also known as the error detection paradigm, has been used to investigate comprehension monitoring abilities in good and poor readers. Students are presented texts containing some type of embedded error and are instructed to underline any errors detected during or after reading. Paris and Meyers (1981) have recently suggested that a directed underlining measure provides a better index of monitoring ability than spontaneous self-corrections during oral reading since the latter index may not accurately reflect monitoring or meaning-getting attempts.

Paris and Meyers (1981, Experiment 1) utilized both monitoring measures to investigate fourth-grade good and poor readers' comprehension monitoring. Children read stories containing either inserted nonsense words or scrambled non-meaningful phrases. On spontaneous oral reading corrections and directed underlining measures, poor readers (i.e., classified on the basis of reading achievement test scores but matched with good readers on math achievement, age, and sex) displayed less accurate comprehension checking than good readers. It was noted that the poor readers did evidence monitoring of words and phrases in stories but did not detect the incomprehensibility of the anomalous information to the same degree as the good readers. Moreover, the ability to apply monitoring skills was found to be significantly correlated with lower comprehension and recall scores. Similar results were obtained in a recent study by Forrest-Pressley (1982).

The results of these studies certainly demonstrate that comprehension monitoring in poor readers is less accurate than good readers and may even be related to the typically inferior comprehension and recall of these children. However, the reasons for inaccurate comprehension monitoring remain unspecified. Poor readers and younger children may have the ability to utilize metacognitive strategies but may fail to employ these strategies on their own. This kind of "production deficiency" for cognitive strategies has been evidence on memory tasks (Paris & Lindauer, 1977) and has been regarded as a general "inactive learner" characteristic of learning disabled children (Torgesen, 1977, a & b). Support for the production deficiency hypothesis would be demonstrated if ways to increase poor reader's successful comprehension monitoring were found. Several researchers have begun to investigate factors influencing poor comprehenders' ability to notice and correct comprehension failures.

In one study Garner (1981) examined whether poor readers' ability to monitor comprehension progress was affected by the processing demands of the task. Previous work suggested that poor comprehenders managed written language as bits and pieces and not as textual wholes (Canney & Winograd, 1979; Smith, 1975). On the basis of these findings, Garner reasoned that the detection of informational inconsistency across sentences of a passage would be more difficult for poor readers than detection of within sentence difficulties. Poor comprehenders with average decoding abilities (i.e., assessed by a reading clinic battery) read and rated the comprehensibility of three short narrative passages about transportation: one containing no errors, one containing a between sentence inconsistency, and one containing within sentence polysyllabic words. Students rated the nonerror passage and the inconsistent error passage as equally comprehensible, but the polysyllabic word passage was rated as much less comprehensible. Garner concluded that poor readers could display comprehension monitoring abilities but only when the task demands were limited to within sentence processing.

This conclusion must be cautiously regarded however, because of two methodological problems. First, the task type was confounded with the within-versus between-sentence manipulation. Secondly, the retention of information from each type of passage was not assessed. Thus, differential task features rather than variations in processing may have contributed to the limited between sentence monitoring of the poorer readers.

In a recent dissertation, not hampered by the above methodological concerns, further support was obtained for the hypothesis that poor readers were influenced by the processing demands of a task (Kaufman, 1981). Learning disabled (i.e., classified on basis of poor reading performances) and non-disabled readers were compared on their awareness and detection of errors embedded at two levels of text coherence (e.g., High Trigger (HT) and Low Trigger (LT)). A HT error was a semantically anomalous word inserted within a single sentence context. Detection of this error presumably required a lower level of text processing than the LT error because no across sentence processing was necessary. A LT error, on the other hand, was a semantically inconsistent sentence that could only be detected through the integration of information across sentences.

Kaufman predicted that the disabled readers would detect more HT errors than LT errors because of their "inactive" processing tendencies. The better readers were expected to detect the two types of errors equally and were expected to detect more of both errors than the poor readers. All of the expected ability differences were not found. That is, the better readers outperformed the disabled readers only on the between sentence (LT) errors. There were no performance differences between the disabled and non-disabled readers in their ability to detect the within sentence (HT) errors -- all children regardless of age or ability did better in detecting the HT error.

These results suggest that a reading disabled child can employ comprehension monitoring strategies when the processing demands of a task are limited to the detection of within sentence errors. The fact that less successful readers display little evidence of comprehension monitoring on tasks requiring the detection of between sentence inconsistencies may be attributed to several factors, such as, their failure to recognize the meaning-getting purpose of reading, their limited involvement in directing their text processing, or their inability to select appropriate standards with which to evaluate ongoing comprehension. One study was found which attempted to determine whether less skilled readers could enhance their comprehension monitoring performances if one or more of these obstacles were remediated.

Garner and Anderson (1982) tested poor readers' facility at detecting informational inconsistency across sentences given three different types of pre-reading instruction. Twenty-four intermediate grade students who possessed average decoding abilities but below average comprehension abilities were randomly assigned to one of three pre-reading treatments. Children in Group One were told to just read the stories, children in Group Two were additionally instructed to determine whether the stories made sense, and children in Group Three were specifically informed that "something was wrong with the stories" and it was their job to "find the parts that did not make sense" in each story. After the children read each of three short narrative passages, they were specifically asked if there was some part that did not make sense in the story.

It was expected that the most explicit directions would enhance the children's monitoring performance. The hypothesized facilitative effect of the training explicitness was not found. Students in all three treatment conditions performed at a uniformly low level. Previous work had shown that the most explicit directive facilitated the comprehension monitoring performances of older skilled readers (Baker, 1979) but this instructional set was not enough to increase the performances of less-skilled readers.

Summary of Ability Differences in Comprehension Monitoring

The results of past research demonstrated less-skilled readers' tendencies to remain relatively deficient in the use of active monitoring and regulating strategies during comprehension. In comparison to peers with average reading abilities, disabled readers displayed limited knowledge of factors effecting reading performance, were less likely to demonstrate their awareness of major blocks to understanding and were less resourceful when encountering comprehension difficulties. These discrepant performances were demonstrated even when the disabled readers were an average of three years older than the normal readers. Moreover, developmental improvements were not found; that is, older students with reading difficulties were just as likely to display deficient comprehension monitoring performances as younger disabled readers (Kaufman, 1981).

The literature investigating the development of comprehension monitoring abilities has certainly documented performance differences between skilled and less-skilled readers. On the basis of these findings, one might be tempted to conclude that cognitive ability deficits account for less-skilled readers' deficient performances. Inferences about ability deficits must not be made solely on the basis of poor performances. The inadequate monitoring and regulating performances of poor readers may reflect what Flavell (1977) has termed a production deficiency or what Campione and Brown (1979) refer to as an inadequate use of executive control processes. Improved performances after task or training manipulations designed to encourage more effective strategy utilization would lend support to these notions.

Little research has been conducted to demonstrate whether the deficient performances of less successful readers can be overcome. The few studies examining this issue have attempted to extend Markman's (1979, 1981) explanations for poor comprehension monitoring performances in young children to children experiencing reading difficulties. Previous work indicated that young children increased their comprehension monitoring performances when the processing demands of the task were lowered. The results of several recent studies have shown that task manipulations of this kind similarly influence the monitoring abilities of less-skilled readers (Garner, 1980; Kaufman, 1981). On the basis of past work with normal learners, it might also be expected that training designed to increase active processing during reading would promote increased comprehension monitoring in less-skilled readers.

Normal readers demonstrated improved comprehension monitoring performances when given instructions specifying the appropriate standard of evaluation to use during comprehension. This type of training was especially effective in improving older students' ability to detect 'between-sentence' errors (Markman & Gorin, 1981). Only one study peripherally examined this issue with less-skilled readers. Garner and Anderson (1982) varied the explicitness of the directions given before reading. Less-skilled readers did not show an improvement in their error detection performance with the more explicit training. The nonsignificant effects of this training may be due to the fact that students were not actually provided a specific standard of evaluation criteria even in the most explicit training condition. Less-skilled readers may require more specific instructions with an evaluation standard before evidencing any improvements in their detection of between sentence errors.

Further work is necessary to examine more fully factors that effect the comprehension monitoring performances of less-skilled readers. Studies are needed to determine whether training designed to enhance active processing or training which specifies the standard of evaluation criteria can facilitate increased comprehension monitoring in less-skilled readers.

Self-Instructional Approaches and Other Training Issues

The last decade has witnessed an avalanche of studies dealing with the training of intellectual skills (Belmont & Butterfield, 1977; Borkowski & Cavanaugh, 1979). One instructional approach that has been successful in eliminating processing deficiencies in problem learners is called Cognitive Behavior Modification (CBM). This approach consists of individually tailored think-aloud programs that combine behavior modification technology (e.g., modeling, overt, and covert rehearsal, feedback, and reinforcement) with processing or strategy training. This type of intervention has been used to teach children what to say to themselves prior to or during their performance on a learning task. Meichenbaum and Asarnow (1979) and Borkowski and Cavanaugh (1979) have pointed to the important interrelationships between CBM and metacognition. The self-instructional aspects of CBM have been likened to metacognitive skills such as planning, checking, questioning, and monitoring. A self-instructional approach has been suggested as one means of teaching students more effective ways to monitor and guide their thinking behavior.

Support for these ideas can be found in a recent study by Schleser, Meyers, and Cohen (1981) in which the effects of a (CBM) self-instructional training program were contrasted with a didactic instructional approach. First- and second-grade children were instructed in their performance on the Matching Familiar Figures Test (MFF). Successful performance on this task involves the selection of an identical pattern to match a given standard. The number of correct choices and a child's response latency serve as the dependent measures.

In this study, the content of the instructions given as well as the format of the training were systematically varied. The informational content consisted of task-specific or general problem solving strategies. These instructions were then embedded in either a self-instructional or in a didactic format where the child was told what to do by the instructor. The authors hypothesized that the children who received a self-instructional format would significantly increase their performance on subsequent MMF tasks relative to children who received didactic training. Additionally, the general self-instructional training was predicted to be the most facilitative on a generalization task.

The results supported all of these predictions. Children who processed the instructions more actively via the self-instructional format showed significantly greater improvements in their performance relative to children in the didactic training groups. Additionally, the general self-instructions were the most effective in promoting generalization. These results were taken as evidence that self-instructional training can be used to foster more spontaneous strategy utilization than traditional didactic approaches. In a similar vein, Borkowski (in press) has suggested that self-instructional routines may be useful in eliciting greater strategy generalization.

Self-instructional training programs as originally conceived were used in the treatment of behavior disorders such as impulsivity. More recently this approach has been employed to teach academically based skills such as reading comprehension. There exists some preliminary evidence suggesting that self-instructional training may be a particularly promising form of reading comprehension instruction. Reading educators have long recommended that students must be trained to take an active role in the comprehension process (Ruddell, 1976; Singer, 1978; Smith, 1975; Ryan, 1981). Singer (1978) envisions an instructional procedure that would increase a student's ability to formulate and react to his/her own questions before, during, and after reading. The self-instructional approach seems ideally suited to the goals of active comprehension.

Self-instructional training has not been frequently employed with reading related tasks, but several studies report promising findings (Bommarito & Meichenbaum, cited in Meichenbaum & Asarnow, 1978; Day, 1980; Short & Ryan, 1982). In a study by Bommarito and Meichenbaum (reported in Meichenbaum & Asarnow, 1979) a self-instructional training approach was used to increase poor readers' comprehension skills. Seventh- and eighth-grade students who were experiencing reading comprehension difficulties were selected for the study (i.e., their reading comprehension scores were at least one year below their grade level and vocabulary level). A reading comprehension task was analyzed into a hierarchical set of objectives which were then translated into self-statements and self-interrogatives. The students received six individually tailored self-instructional training sessions. The widely used CBM self-instructional package developed by Meichenbaum and Goodman (1971) was utilized. The five steps outlined in this package systematically move the child from didactic instruction to covert self-instruction. In this study the students' self-talk consisted of general critical thinking and heuristic principles that could later be applied to any reading material.

The results indicated that students who received the self-instructional training significantly improved their reading comprehension as compared to students in a practice placebo group and students in an assessment-only control group. The mean change in scores for the self-instructional group was superior to each control group on both a standardized test of reading comprehension, and an alternative type of reading comprehension test consisting of Cloze exercises.

A study by Short and Ryan (1982) demonstrated that a self-instructional training program can facilitate less-abled readers' recall of story information. The self-instructional strategy employed consisted of five Wh questions designed to focus on broad story grammar categories (Stein & Glenn, 1979). Poor readers who received the self-questioning strategy recalled more story information than poor readers who received comparable attributional training designed to encourage self-reinforcement and coping strategies. Although not significant, there was also a tendency for children who had been trained with the self-interrogation strategy to be more efficient at detecting and correcting embedded errors in texts. More importantly poor readers who received the self-instructional format displayed a similar level of performance as skilled readers who received no strategy training. These results confirm the prediction that self-instructional training can be a very effective approach for helping inactive learners utilize more strategic comprehension monitoring processes during reading.

In a recent doctoral dissertation, Day (1980) found that junior college students experiencing writing difficulties benefitted from explicit self-instructional training concerning summarization rules. "Average" students with no reading or writing problems and "remedial" students who were diagnosed as poor writers but who were of normal reading ability received one of four self-training approaches. The content of the self-instructions varied in their degree of rule and integration explicitness.

Day found that remedial students' summary writing performance improved only with the most explicit training. The most explicit self-instruction involved training in the summary rules as well as training in the monitoring and regulating of these rules. Remedial writers needed the most explicit training to bring their level of performance up to that of the average students. Overall the average students benefitted more from training than did the remedial students, but all students evidenced improved performances after self-instructional training.

The results of these studies certainly support the implication that self-instructional training can be effectively applied to complex reading and writing tasks. Possibly self-instructional strategies lead students to adopt more active self-regulated learning styles (Ryan, Ledger, Short, & Weed, 1982). Given that unsuccessful students generally approach the task of reading in a passive-inactive fashion (Golinkoff, 1975-1976; Ryan, 1981; Torgesen, 1977b), self-instructional interventions may help to promote more deliberate strategy utilization. Students with more severe learning difficulties may require more explicit self-instructions, however (Brown, Campione, & Day, 1981; Day, 1980). That is, less-skillful readers may require self-instructions specifying the important task components and comprehension monitoring strategies necessary for successful performance.

The results of previous work certainly lead one to conclude that self-instructional approaches deserve further evaluation. Future research is needed to assess the efficacy of employing self-instructional training as a means of promoting increased comprehension monitoring performances, especially with students notorious for their passive approach to learning. Studies are needed to determine whether these students can be trained to successfully apply comprehension monitoring strategies during reading.

The ultimate educational utility of any instructional procedure, however, rests in its ability to foster maintenance and generalization. As Ann Brown (1978) has pointed out, instructional research must attempt to assess the effects of training on both maintenance and generalization tasks. Much of the past instructional research has been plagued by the fact that trained strategies have not been maintained over time or have not transferred to different situations or tasks (Borkowski & Cavanaugh, 1979; Campione & Brown, 1977; Meichenbaum & Asarnow, 1979; Pressley, Heisel, McCormick, & Nakamura, 1982). Typically, instructional effects are deemed effective on the basis of demonstrated improvement with similar tasks during immediate posttests. Therefore future work involving self-instructional manipulations must be designed with maintenance and generalization goals in mind.

Chapter 3

Statement of the Problem

In the preceding chapters evidence has been provided documenting the importance of comprehension-monitoring processes during reading. Successful comprehension monitoring entails keeping track of how one's comprehension is proceeding and taking remedial actions if progress is hindered. The findings of past research suggest that young children and less skillful learners do not consistently employ comprehension monitoring strategies during reading. One must not quickly assume, however, that the poor performances of immature readers reflects ability defects. Various task and training manipulations have been successful in promoting improved performances.

Explanations have been posed for the lack of spontaneous comprehension monitoring performances evidenced in immature readers (Markman, 1981). First, less-skilled readers adopt a nonstrategic-passive approach to reading, in contrast to efficient readers who confront the task in a more strategic-active fashion. The passive approach of the immature readers results in limited constructive processing during comprehension which subsequently hinders their ability to recognize when failures in comprehension have occurred. A second explanation for poor comprehension-monitoring performances in immature readers is that they do not select appropriate standards to assess whether material has been understood.

Training designed to remediate one or both of these processes facilitated the comprehension monitoring performances of older children, but improvements in comprehension monitoring performances were not consistently evidenced by younger children or less successful readers. This was the case especially on more complex error detection tasks requiring the integration of information across sentences. Relatively little work has been conducted to determine whether immature readers' detection of 'between-sentence' errors can be improved with training designed to promote active constructive processing or training designed to specify a standard of evaluation. In order to clarify the sources of metacomprehension difficulties for immature readers, more work is needed under conditions with and without training to elicit these processes.

One type of instructional approach that has been successful in promoting more spontaneous strategy utilization in problem learners is self-instructional training. The goal of self-instructional training is for children to gain personal control over their own learning behavior. Recently this approach has been employed with readers as a means of increasing their comprehension and recall during reading. The results of this work certainly suggest that a self-instructional format helps students engage in more active processing during reading. Since the inefficient processing of immature readers has also been hypothesized to affect the utilization of metacognitive skills, a self-instructional approach may be one means of promoting increased comprehension monitoring performances in young children.

One purpose of this study was to determine whether self-instruction could be used to increase fifth-grade students' comprehension monitoring during reading. Specifically, this question was addressed by determining if fifth-grade students who received self-intructional training improved more in their ability to detect embedded text inconsistencies, requiring the integration of information across sentences, than students who received equivalent didactic instruction.

A second purpose of this study was to investigate two levels of specificity within a self-instructional format. In one type of self-instruction, the content of the self-directives indicated the standard of evaluation criterion to be employed. In a second type of self-instruction, no evaluation criterion was specified. By contrasting these two levels of self-instruction, one could determine whether the inclusion of an evaluation criterion within a self-instructional format promoted greater comprehension monitoring performances in young students than a self-instructional format with no evaluation criterion specified.

A third purpose of this study was to assess the effect of each type of training with young readers who were designated as very proficient comprehenders versus readers who were classified as less proficient comprehenders to determine if self-instructional training was equally beneficial with students of differing reading levels. Additionally, the two reading comprehension levels were included to assess whether average readers, trained as noted above, differed from superior readers in the amount of improvement evidenced after training.

Finally, the fourth purpose of this study was to assess the maintenance of the training effects. It was considered important to determine whether improvements in comprehension monitoring performances evidenced immediately after training would be maintained over a one-week delay period.

In order to address these issues, students were tested on their ability to detect inconsistencies before, immediately after, and approximately one week after receiving training. Students were classified as either superior or average comprehenders and were assigned to one of three instructional conditions devised for the present study. An explanation of each condition is presented below:

(1) Specific Self-Instruction. (SS-I)

The specific self-instructional package contained self-statements specifying the optimal standard of evaluation criterion for the task. The students in this condition were taught to focus on oppositional meanings between sentences. This instruction was geared specifically toward the detection of inconsistencies in the text.

(2) Neutral Self-Instruction. (NS-I)

The neutral self-instructional package contained self-statements but gave no specific standard of evaluation criterion for the task. The students in this condition were taught to focus on confusing parts or parts that were difficult to understand. This instruction was geared generally toward the detection of any problems in the text.

The error detection performance of these two self-instruction groups was compared to that of a control didactic group.

(3) Control Didactic Instruction. (C-D)

The control didactic instructional package contained the same instructional content as the neutral self-instructional package. The students in this condition were taught to focus on confusing parts or parts that were difficult to understand. These instructions were worded in the second person and were presented by the examiner thereby eliminating any active participation on the part of the student.

This control group was thought to be the most rigorous comparison group for the self-instruction conditions. Previous work had shown that students' error detection performance could be improved with just a minimal warning to look for problems in the text. Thus, improvement was anticipated for the control didactic students. However, the more interesting and "practically" significant question to be addressed in this study was whether self-instructional training would promote greater improvements in children's monitoring during reading than the didactic instruction.

A more extensive explanation of each instructional condition and the exact scripts used during training can be found in the methods section and in Appendix D.

Hypotheses

A total of eleven predictions were made in terms of the improvements in the number of correctly identified text errors evidenced after training. Six of the contrasts can be classified as answering questions about the effects of each type of training. The other five contrasts are directed to questions regarding the different performance gains evidenced by superior and average readers who received the various types of training. The same set or predictions held for improvements evidenced immediately after training and improvements evidenced after a week's delay interval.

Training Condition Hypotheses

Three comparisons within each ability level were made to assess the effect of instructional condition for each type of reader. (This resulted in a total of six contrasts across conditions.)

First, it was predicted that there would be a beneficial effect of self-instructional training. The specific question addressed was whether fifth-grade readers exhibited greater improvements in their error detection performances when trained to use a self-instructional strategy than when trained with equivalent didactic instruction. A comparison was made between the neutral self-instruction condition and the didactic control condition within each ability level. It was anticipated that the NS-I training would elicit greater improvements in comparison to the C-D instruction because the self-instructional format provided more active processing components than the teacher directed format. Students of both reading abilities were expected to benefit from the training which encouraged more active and strategic participation on the part of the learner (Ryan, et al., 1982). Thus, the comparison between the NS-I and C-D conditions for each ability level was directional.

A second comparison was made between the students who received the specific evaluation criterion in conjunction with the self-instructional format and students who received the didactic training within each ability level. The expectation was that training designed to give a specific standard of evaluation in combination with the benefits of the active processing components inherent in a self-instructional format would elicit greater improvements in all students' error detection performance in contrast to didactic training. This prediction was based on past work suggesting that students were better able to detect embedded errors after receiving an explicit standard of evaluation criterion to employ during reading (Markman & Gorin, 1981).

The third comparison was made between the two levels of self-instructional training to determine whether children's improvement in comprehension monitoring performances was enhanced by the inclusion of a specific evaluation criterion. It was expected that students in the specific self-instruction group would display greater improvements than students in the neutral self-instruction group. The comparisons between the SS-I and the C-D conditions as well as the comparison between the SS-I and NS-I conditions within each ability level were directional.

Ability Level Hypotheses

A second group of five predictions were concerned with whether average readers differed from their more successful peers when trained as noted above. Again training effects were assessed by the improvements evidenced immediately after training and improvements evidenced one week later.

In two comparisons, the performance gains of the strategy trained average readers in each self-instructional condition were contrasted with the improvements evidenced by the superior comprehenders who received the didactic control training. Another two comparisons were made between the average and superior students who were in the same self-instruction condition in order to determine if the readers of both ability levels displayed similar performance gains after receiving self-instructional training. No reasonable directional hypotheses could be made for either of these two sets of comparisons.

Finally, it was anticipated that an interaction effect between the type of self-instruction and ability level would possibly be present. In particular, it was anticipated that the treatment differences between the two types of self-instruction should be larger for the average than for the superior readers. This prediction was based on past work which demonstrated that less successful students required more explicit instruction to evidence increased levels of writing performance (Day, 1980). Thus, the interaction comparison between the different readers in each of the two self-instruction conditions was directional.

Chapter 4

Method

Subjects

Students in six, fifth-grade classes were subjects in this experiment. The classes were taken from four different elementary schools representing the same socioeconomic and geographical areas in a midwestern town. The 101 students who returned a permission form were administered the Auditory Vocabulary (Test 1) and Reading Comprehension (Test 2) subtests of the Stanford Diagnostic Reading Test, Brown Level, Form A (Karlsen, Madden, and Gardner, 1977). The testing was completed during the latter part of the school year. All children were tested within their classrooms at each school. Seventy-eight students were selected for the final study. The final selection was based on a two-step screening procedure. The score from Test 1 served as the vocabulary score and the score from Test 2 served as the comprehension score for each student.

First, students who had obtained a vocabulary score lower than a fourth-grade level were omitted from the study. Two students were dropped from the total pool at this point. This decision was made to insure that differences in reading skill among the children centered mostly on comprehension and less on vocabulary abilities.

After screening for vocabulary level, children were classified as either superior or average comprehenders on the basis of their total comprehension score. Students with a total comprehension score at or above an eight-grade level were designated superior comprehenders. The eighth-grade reading level was chosen as the cut-off score to allow for a two year grade level difference in comprehension between the superior and average readers. The grade level scores for the superior group ranged from 8.0 to 12.3. Forty-three students were classified as superior comprehenders from which thirty-nine students were randomly selected for participation in the remainder of the study. All thirty-nine students were designated by their teachers as above average readers. The final superior reader sample consisted of twenty-eight females (one Black, the rest Caucasian) and eleven Caucasian males with an average age of 11.0 years.

Students with a total comprehension score at or below sixth-grade level were designated as average comprehenders. The grade level scores for this group ranged from 2.9 to 6.0. Thirty-nine students were classified as average comprehenders. All of these students participated in the remainder of the study and all were designated by their teachers as either average or below average readers. The final average reader sample consisted of twenty-three females (one Black, the rest Caucasian) and sixteen males (two Black, the rest Caucasian) with an average age of 11.2 years.

The thirty-nine students from each reading classification were then randomly assigned to one of three experimental conditions (n-13). Approximately equal numbers of students from each school were represented in each experimental condition. Means and standard deviations for each of the experimental groups on the Auditory Vocabulary and Total Reading Comprehension subtests of the *Stanford Diagnostic Reading Test* are reported in Table 1. A one-way analysis of variance performed for each reading comprehension level indicated no significant differences on the total comprehension and vocabulary scores among the three treatment groups, all F's $(2,38) < .42$, $p > .65$.

There was no subject attrition during the study. Pretest, immediate, and delay test scores were obtained for all seventy-eight students in the final sample.

Design

All students were individually tested on their ability to detect embedded text inconsistencies before, immediately following, and approximately one week after training. Students within each of the two reading designations were randomly assigned to one of the three training conditions. There were two self-instructional conditions and one teacher-directed or didactic condition in the study. The two self-instruction groups differed in terms of the explicitness of the self-directives. Students in the *Specific Self-Instruction* condition were taught to apply a specific standard of

Table 1

Means and Standard Deviation on Vocabulary and Total Comprehension Performance for the Three Experimental Groups at Each Reading Comprehension Level

Superior Readers in Each Treatment Group

	Specific Self		Neutral Self		Control Didactic	
	Voc.	T.Comp.	Voc.	T.Comp.	Voc.	T.Comp.
$\bar{X}$	8.88	9.63	8.22	9.59	8.50	9.53
SD	1.62	1.41	1.69	1.30	2.17	1.28

Average Readers in Each Treatment Group

	Specific Self		Neutral Self		Control Didactic	
	Voc.	T.Comp.	Voc.	T.Comp.	Voc.	T.Comp.
$\bar{X}$	5.52	4.84	5.69	4.87	5.83	4.97
SD	1.19	.93	1.07	1.02	.98	.88

evaluation in the instructional activity. Students in the Neutral Self-Instruction condition were taught to apply a more general standard of evaluation within the instructional activity. Students in the Control Didactic condition were given the same instructional content as those in the Neutral Self-Instruction condition but in a teacher-directed format. More detailed information on these instructions is provided in the Procedures section of this chapter.

Materials

During the three testing sessions, students orally read eight different passages, four of which contained no obvious errors (filler passages) and four of which contained one purposefully embedded inconsistency (error passages). The four error passages presented at each testing interval were the experimental items of interest (i.e., a total of twelve error passages). The filler passages were included to eliminate possible response biases that could result from employing only passages containing errors.

The passages used in the final study were selected from an original pool of twenty-four error passages. All passages were written to overcome several confounding variables present in past error detection materials. Once passages met certain established criteria, three pilot studies were implemented to determine which passages to select for the final study. An explanation of the criteria used to construct the passages will be presented followed by a review of the criteria used to select the final passages.

The error passages used in the present experiment were based on, but were not taken directly from previous studies investigating children's comprehension monitoring performances. New materials were developed because past work did not control for several text variables. Five specific problems were identified in the passages used previously:

1) the type of between sentence error was not held consistent from one passage to another,
2) the amount of conflicting information pertaining to the error was not constrained from one passage or one type of error to another,
3) there was not control over the placement of the error in the passage,
4) the number of sentences intervening between the error information and the information it conflicted with was not held constant,
5) other text characteristics such as sentence complexity, length, and readability level were left to vary without precise measurement or control.

The error passages for the present study were constructed so that each of these problems could be controlled or eliminated. First, each passage contained only one error, and the type of inconsistency errors to be used were specifically designated. An inconsistency error was defined as a sentence in which a major concept from one previous sentence was replaced either by an antonym or by a negation of a synonymous concept from the previous sentence. For example the sentence, "Aluminum is a cheap metal," is inconsistent with the sentence, "It would be expensive to buy aluminum for the sides," because the concept "cheap" is replaced with the antonym "expensive" in the latter sentence. Likewise, the sentence "Stunt people take risks for the movie stars," is inconsistent with the sentence, "But stunt people never take chances for another person," because the concept "take risks" is replaced with a negation of a synonymous concept "never take chances" in the latter sentence. All antonym and synonym concepts were taken from the *Roget's University Thesaurus* (1963).

The decision to employ two kinds of inconsistency errors was based on practical rather than theoretical concerns. First, by employing two different kinds of inconsistencies, response biases could be avoided. Secondly, the incorporation of two kinds of errors aided in the construction of passages. An effort was made to control for this variable by assigning equal numbers of each error type at each testing interval for every student.

Moreover, by specifying the type of error as either an antonym or a negation, the amount of conflicting information pertaining to the error was constrained. That is, only two sentences of the passage contained the information necessary to detect the error. In all cases the error sentence was consistently defined as the latter sentence which contradicted a concept stated in one previous sentence.

The placement of the error sentence was controlled in two ways. First, neither the error sentence nor the sentence containing the contradicted information was placed in the first two sentences. Secondly, half of the passages were written with error sentences occurring as the last sentence of the passage and half of the passages had error sentences occurring in the middle of the text. The amount of information intervening between the target error and the sentence it contradicted differed depending on whether the error occurred at the middle or at the end of the text. Errors in the middle of the text had one to two sentences intervening whereas the errors at the end of the text had four or five sentences intervening between the target error and the sentence it contradicted. Students were assigned an equal number of passages with errors from each location in order to control for the placement and amount of intervening information.

Finally, the passages were written to control for several other text variables, such as length, sentence complexity, and readability level. All passages were written at or below a fourth-grade reading level as determined by the Fry Readability procedure (Maginnis, 1969). Each passage contained from nine to eleven sentences with an average of eighty-three words. The designated target error sentences were similar in length and in syntactic structure. Additionally, twelve filler passages were written to be similar to the error passages. The number of words and sentences and the readability level of the twelve error passages and the twelve filler passages employed in the final study can be found in Table 2.

In summary, all passages were constructed to be similar in length and readability level. More importantly, however, the error passages were written to vary along two dimensions, error type and error placement. This resulted in a two by two matrix consisting of four types of error passages. At the outset of the study six stories were written to correspond to each cell of the matrix as displayed in Figure 1. This is, different passages were written to contain six each of the following: antonym errors placed in the middle of the passage, antonym errors placed at the end of the passage, negation errors placed in the middle of the passage, and negation errors placed at the end of the passage.

Table 2

Word Counts, Sentence Counts, and Readability Levels of the

Final Twelve Error Passages and Filler Passages

Error Passages

Title	Number of Words	Number of Sentences	Readability Grade Level
Camp	80	9	3.3
Diamonds	76	10	3.5
Fish	97	10	2.5
Houses	83	9	4.0
Hummingbird	75	9	3.3
Icebergs	93	11	2.7
Ireland	81	10	3.9
Journal	81	10	3.3
Oyster	92	11	3.5
Rat	76	10	3.5
Stunt People	76	9	3.5
Worms	89	11	2.8

Filler Passages

Title	Number of Words	Number of Sentences	Readability Grade Level
Body	89	10	3.3
Bridge	86	10	2.7
Buttons	74	10	4.0
Cocoa Bean	76	9	2.5
Coin	81	9	2.8
Feathers	87	10	3.2
Flying Belt	102	11	2.7
News	96	10	3.0
Octopus	89	10	3.5
Roots	80	10	2.3
Rubber	107	11	3.0
Venus Flytrap	84	10	2.5

		Error Type	
		Antonyms	Negation/Synonyms
Error Placement	Middle	Six passages	Six passages
	End	Six passages	Six passages

Figure 1. A matrix of error passages.

Information from several Barnell Loft Skill Building (Boning, 1972) workbook series (i.e., Getting the Main Idea, Finding the Details, Drawing Conclusions, levels B - D) was used in constructing the passages. Each of the 36 passages (i.e., 24 error and 12 filler) and their titles were typed in block capital letters in the middle of 27.5 cm. x 21.5 cm. white sheets. The remainder of this section will present the procedures used to select the twelve error passages selected for the final experiment. (See Appendix A for examples of the 24 passages included in the final study.)

Pilot Studies

From the original 24 error passages, only 12 passages were selected for the final study. The final selection of error passages was based on the results of three pilot studies. The purpose and procedures of teach study will be briefly reviewed to outline the rationale for the final selection of passages.

Pilot Study 1 - Adult Verification

The purpose of the first pilot study was to assess whether mature, adult readers would readily identify the predesignated target errors. Ten college undergraduates enrolled in an Educational Psychology course received extra credit for participating in the study. The students were asked to judge some materials that had been written for children's workbooks. The students were told:

"We have written some passages for children's workbooks. We want to find out if the stories are easy to understand. So I would like you to read the passages and then decide if there are any problem parts that make them hard to understand.

Please underline any parts that you think are confusing. Some passages may have problems in them and some may not. If you think that everything in the passage is OK, that is, if the passage has no problems, then do not underline any sentences.

If you do underline any sentences in the passage, please give a reason for your decision at the bottom of the story. This will help us to make changes in the stories later.

OK, if you don't have any questions, you can go ahead and read and judge the stories. When you are finished please raise your hand and I will come to collect your booklet.

Thank you for helping us with this."

Each person silently read and judged thirty stories (i.e., twenty-four error and six of the filler passages). The stories were presented in packets with the order of presentation randomly determined for each student. An error was scored as correctly identified if both the designated target error sentence was underlined and an explanation referring to the conflicting information was given. The percentages of correct adult responses for each of the twenty-four error stories can be found under Study 1 in Table 3.

Adult verification was one of the three criteria used to determine the passages selected for the final experiment. That is, only passages containing errors which were correctly identified and explained by 90% or more of the adults were considered. Further discussion of the selection procedure is detailed below.

Pilot Study 2 - Fifth-Grade Verification

The purpose of the first pilot study was to assure that all errors were easily detected by mature adult readers. The purpose of the second pilot study, on the other hand, was to establish that fifth-grade students would have difficulty detecting the same embedded errors. This was deemed necessary since the present materials were substantially different from those used in the past. Three classes of fifth-grade children were tested in groups within their own classrooms. The schools were located in the same geographic area as the schools in the main study. Several different packets of stories were constructed consisting of four error passages and four filler passages. The order of passage presentation was random within each packet. Students from each class were randomly

Table 3

Results of Pilot Studies on Original Thirty-six Error Passages

Antonyms				Negation/Synonyms			
	Middle				Middle		
Title	Study 1*	Study 2**	Study 3***	Title	Study 1*	Study 2**	Study 3***
	N-10	N-11	N-24		N-10	N-11	N-24
Camp	100	18	100	Houses	100	9	96
Kangaroo	100	27	96	Ireland	100	9	100
Oyster	100	00	92	Journal	90	9	100
Pigeons	50	----	100	Koalas	90	27	100
Snakes	100	45	100	Loch Ness	90	9	100
Stunt People	100	09	100	Sugar	60	----	92
	End				End		
Title	Study 1*	Study 2**	Study 3***	Title	Study 1*	Study 2**	Study 3***
	N-10	N-11	N-24		N-10	N-11	N-24
Ants	90	----	77	Diamonds	100	00	100
Corn	100	45	96	Icebergs	90	18	100
Favorite Dish	100	36	92	Ice Cream	70	----	100
Fish	100	9	96	Rain	100	63	100
Hummingbird	90	9	100	Subway	90	54	96
Rat	90	18	96	Worms	100	18	100

* percentage of adults correctly identifying errors.

** percentage of fifth-grade students correctly identifying errors.

*** percentage of fourth-grade students able to identify the opposite concepts on the multiple choice test.

NOTE: The underlined titles are the passages selected for the final study.

distributed an eight-page test packet (i.e., one passage on each page). The instructions given to the young students were the same as those given to the college adults. Students were given as much time as needed to silently read and judge the stories. The children were told to request help with words they could not read. Only a few students required decoding assistance.

An error was scored as correctly identified if the designated error sentence and a correct explanation were given. The percentage of correct child responses for each of the twenty-four error stories can be found under Study 2 in Table 3. The percentage of fifth-graders correctly identifying the passage errors was another criterion used to determine the passages selected for the final experiment. A decision was made to include a passage if less than twenty percent of the fifth-grade students correctly identified the error.

A tally was made of the types of responses generated for each error passage to determine whether students received scores of zero because they did not identify the errors or did not verbalize the explanation of the error. As mentioned previously, a score of one indicated that a child identified an error and explained the problem by referring to the contradictory information in the passage. On the other hand, a score of zero was given for all other responses including: 1) a child indicating an error passage was completely acceptable, 2) a child identifying some other nonproblematic information in an error passage, or 3) a child identifying the correct target error sentence but not providing a correct explanation of the error. Out of the 220 possible responses (i.e., 55 students x four possible errors), 48 responses (22%) received a score of one, 152 responses (69%) received a score of zero because nothing in the error passages was designated as problematic. Thirteen (6%) out of the possible 220 responses received a score of zero because non-error information was identified as problematic, and seven responses (3%) received a score of zero because the target error was underlined but was not correctly explained. On the basis of these results it was concluded that zero responses were primarily a result of children's tendency to say that a passage containing a blatant contradiction was perfectly comprehensible.

Additionally, an inspection was made of the number of errors correctly identified by each child to determine what percentage of the children were able to detect most of the errors spontaneously. Previous work with different materials had suggested that similar 'between-sentence' error tasks were difficult for fifth-grade level children. From a total of 55 students tested, only six students (10%) detected three or all of the four errors in the packet. On the basis of this finding it was assumed that there was room for improvement in fifth-grade students with the present error detection.

Pilot Study 3 - Fourth-Grade Test of Opposites

A third pilot study was conducted to determine if the oppositional concepts in the error passages were easily understood by young students when not embedded in test passages. This was done to insure that poor comprehension monitoring performances were not just a reflection of the fact that students did not know that the two concepts were indeed contradictory. Additionally, since readers of different comprehension levels were employed, it was necessary to assume that the inconsistent concepts would be equally familiar to both groups. Thus, students at a lower grade level (i.e., fourth-grade) than that used in the final study were tested on their knowledge of the opposite concepts used in the error passages. If younger students could successfully identify the opposite concepts it could be reasonably assumed that the same concepts would be familiar to older children.

A multiple-choice test was constructed to assess the children's knowledge of the opposite concepts. The concepts were presented in short simple sentences. Each item of the test represented one of the twenty-four opposite concepts used in the error passages. For each item, one sentence was presented followed by three other sentences, one of which was opposite to the first sentence. A student was instructed to circle the sentence opposite in meaning from the first sentence. A correct response corresponded to one of the target error concepts. The multiple-choice test can be found in Appendix B.

The multiple-choice test was group administered to one fourth-grade class consisting of twenty-four students. The students followed along as the experimenter read each item. The instructions given to the student were as follows:

"I need your help today. I want to find out if children your age know what opposites are. I will be asking you to find the opposites of some sentences. Do you know what I mean by an opposite? For example, if I said the word black - a word that would be an opposite color is white. Right?

OK, Please look at the top page under your name. On the top line is the sentence: They are big things. Now look below that sentence to the three choices below. Listen as I read each answer. Which means the opposite of: They are big things? A) They are bright things. B) They are small things, or C) They are pretty things? Listen as I read the sentence and choices again. (A, B, C) Now circle the letter next to the sentence that means the opposite of the top sentence: They are big things. Did you circle B? That is the right answer.

Now does everyone understand what I mean by choosing the opposite? Any questions so far?

OK. On this paper you will have twenty-four more sentences. For each one I will read the top sentence first then I will read the three sentences below it. Please read along with me. After I am finished reading I want you to circle the letter next to the sentence that is the opposite of the idea in the first line. OK? Any questions? I will read all of the sentences twice. Please listen carefully to all of the choices. Make sure you circle just one letter.

OK. Open your booklets to the next page and look at number _#_. It says _#_. Now look below it and listen to the three choices. Which means the opposite of _#_? A)____, B)____, or C) ____? Listen again as I read the top sentences and the choices. OK. Circle your answer." (Same procedure for all items.)

The precentage of students selecting the correct opposite for each item is also shown on Table 3 under Study 3. Familiarity with the opposite concepts was another criterion used to determine the passages selected for the final experiment. Specifically, any opposite concepts that were correctly identified by over 90% of the fourth-graders were assumed to also be known by fifth-grade students (i.e., the age to be tested in the final experiment). The fact that the young children could easily identify opposite concepts in a multiple-choice test, but yet had difficulty detecting these same inconsistencies embedded in texts lends further support to the idea that young students do not apply comprehension monitoring strategies during reading.

Selection of the Final Error Passages

The three pilot studies provided a means of assessing the twenty-four passages. A verification of each error was obtained through the consensus of adult judges in Study 1. The results of Study 2 indicated whether the errors were difficult for young children to detect. Finally, the results of Study 3 determined whether young children understood the opposite concept corresponding to each error.

Based on the three pilot studies, twelve error passages were selected for use in the final experiment. A passage was selected if it satisfied the three following criteria:

1) At least 90% of the adults in Study 1 were able to identify the error.
2) Less than 20% of the fifth-grade students in Study 2 were able to identify the error.
3) At least 90% of the fourth-grade students in Study 3 correctly selected the opposite concept on the multiple-choice test.

Additionally, the error passages were selected so that the four types of error passages were equally represented. That is, three of the twelve passages contained antonym errors occurring in the middle, three contained antonym errors occurring at the end, three contained negation errors occurring in the middle, and three contained negation errors at the end. The titles of the twelve error passages and the twelve filler passages used in the final experiment are presented in Table 4.

The final twelve error passages were then assigned in random blocks to one of twelve test packets, with four stories designated as the pre, four as the immediate, and four as the delay test items. The twelve packets were constructed so that every error passage was represented equally across all testing times. Additionally, the four error passages at each testing time contained one of each type of error passage (i.e., one passage from each cell of Figure 1). Students in each training condition were randomly assigned to one of the twelve test packets to insure that all error passages were equally represented across each testing time and each training condition. The title of the stories used at each testing time for all twelve test packets can be found in Appendix C.

Table 4

List of Stories Used in Final Experiment

Error Stories

Title	Error Type	Error Placement
Camp	Negation	Middle
Oyster	Negation	Middle
Stunt People	Negation	Middle
Fish	Negation	End
Hummingbird	Negation	End
Rat	Negation	End
Houses	Antonym	Middle
Ireland	Antonym	Middle
Journal	Antonym	Middle
Diamonds	Antonym	End
Iceberg	Antonym	End
Worms	Antonym	End

Filler Stories

Title
Body
Bridge
Buttons
Cocoa Bean
Coins
Feathers
Flying Belt
News
Octopus
Roots
Rubber
Venus-Flytrap

The pre, immediate, and delay test packets always consisted of four error passages and four filler passages. The filler passages presented at each testing time were randomly preselected. All students received the same filler passages at each testing time. The order of presentation for the eight passages at each test time was randomly determined. This was accomplished by shuffling the pages containing each passage. All of the twelve error passages and the twelve filler passages used in the final experiment can be found in Appendix A.

Procedure

Pilot Study 4 - Training Procedures

Before the actual study was begun, a fourth pilot study was conducted with an independent group of fifth-graders. The purposes of this study were:

1) to determine whether four error passages would be sensitive enough to detect variations in student performance,
2) to test the clarity of the specific self-instructions,
3) to determine children's error detection performances before and immediately after specific self-instruction and control didactic instruction, and

4) finally, to contrast the performance gains of children in the two instructional conditions.

Twenty students from one fifth-grade classroom were subjects in this pilot study. Ten students were randomly assigned to either the Specific Self-Instruction condition or the Control-Didactic condition. Sex and reading ability level (i.e., as determined by the teacher's rating) were counterbalanced across each condition. Students were tested on their error detection performances before and immediately after receiving training corresponding to their designated condition.

The materials for the study were eight error and eight filler passages selected randomly from the pool of thirty-six passages. The same passages were presented to all students but the presentation time for each passage (i.e., pretraining versus posttraining) was randomly determined. Students were given four filler and four error passages at each test time with the restriction that the error passages at each test time included both locations and types of errors. That is, students orally read one passage corresponding to each cell of the matrix in Figure 1 during each test time.

Students were seen in two individual sessions. During the pretest session all students were given the following instructions:

"Hi, my name is ____. I am working on a project where we are writing stories for children's workbooks. I want to make sure that the stories are easy to understand. So that is why I would like your help.

I would like you to judge some stories. It is hard for me to know sometimes what would be hard for kids your age to understand. So your job will be to decide if there are any problems with the stories. Some of the stories may be hard to understand because of problem parts. I want you to underline any parts of the story that are hard to understand. Underline anything you think is confusing in the story. Some of the stories may be OK and may be easy to understand so you will not have to underline anything. As you read the stories you can make believe you are a detective looking for problems.

Do you know what you are supposed to do? Any questions? If you need help reading any word I can read it for you. But you decide all by yourself if there are any problems. If you think there are any problems, please underline them. If not, then do not underline anything. OK, here is the first story. Please read the story outloud."

(Child reads.)

"OK, any problems?

(After child decides - if a problem is indicated.)

"OK, you just decided that this was a problem. Can you tell me in just a few words why you think it is a problem? This will help me make changes later on."

Then students orally read and judged all eight pretest passages. Students were told not to discuss any of the passages or procedures with classmates and were told they would participate in one other session.

The second session was held approximately three days later and consisted of a training and an immediate test phase. During the training phase children received instruction appropriate to their assigned condition (i.e., Specific Self-Instruction or Control Didactic Instruction). The pilot study training procedures are identical to those used in the final experiment. Therefore, a more detailed explanation will be presented in the following section. The actual scripts used for the training can be found in Appendix D.

Following training, all students were tested immediately on their error detection performance with the eight passages designated as the post training test packet. All students were told:

"Now you will get some of my other stories. These stories are not practice stories. I want you to decide if there are any problems with these stories all by yourself. Read the story out loud and remember to use the /thinking/ instructions just like you practiced, OK?

Underline any parts that are confusing or any parts that are hard to understand. If everything is easy to understand then don't underline anything. Some stories might have problems and some may not. Do you know what you are supposed to do?

If you need help reading any word I'll read it for you. But you decide all by yourself if there are any problems in the story, OK?

Here is the first story. Tell me when you are finished deciding."

(Child reads.)

"OK. Any problems, or is anything hard to understand?"

(After child decides - if a problem is indicated.)

"OK, you just decided that this was a problem. Can you tell me in just a few words why you think it is a problem? This will help me to make changes later on."

All children's responses on each passage of the pre and post training test packets were scored as either 0 or 1, indicating respectively an incorrect or correct response. A score of one indicated that a child underlined the target error and correctly identified the designated contradictory information. A student's points were totaled across the four error passages to arrive at an error detection score for each test time.

Different scores were computed for children in the two training conditions by subtracting pretraining performance from posttraining performance. A one-way analysis of variance performed on the post - pre difference scores for each condition indicated there was a significant difference in the performance gains between the two training conditions ($F(1,18) = 4.985$, $p < .03$). Students in the Specific Self-Instruction group improved more in their error detection performance than students in the Control-Didactic group after receiving the training. Table 5 displays the means and standard deviations for the pretraining, posttraining, and difference score for each instructional condition.

An inspection of the results in Pilot Study 4 also indicated that a test consisting of four stories was sufficient to detect variations in children's pre and post training performances. A ceiling effect was not evidenced in either condition even after training, suggesting there was room for further improvement. Finally, the results of the pilot study demonstrated that the training was easily administered and easily understood by all students. Based on these results and impressions, the same task and training procedures were adopted for the final experiment.

Table 5

Means and Standard Deviations for the Pretraining, Posttraining, and Difference Scores for Each Instructional Condition in Pilot Study 4

	Specific Self			Control Didactic		
	Pre*	Post*	Difference**	Pre*	Post*	Difference**
$\overline{X}$	.60	3.00	2.40	.70	1.90	1.20
SD	1.08	.67	1.17	1.06	1.29	1.23

* Scores ranged from 0 to +4 for each student.
** Scores ranged from -4. to +4. for each student.

Study Proper

Procedure for Experimental Study

Following the inital reading ability screening, 78 students (i.e., 39 superior and 39 average comprehenders) were selected to participate in the actual study. The 39 students from each reading comprehension level were randomly assigned to one of three training conditions, Specific Self-Instruction (SS-I), Neutral Self-Instruction (NS-I), or Control Didactic Instruction (C-D), resulting in 13 students per condition.

All 78 students were seen individually for the next three session. Session one was designated as the pretest, session two included the training and immediate test, and session three was designated as the delay test. Sessions one and two were spaced one week apart. Session three was scheduled within seven to ten days of session two. An outline of the procedure is presented below in Table 6 followed by a more detailed description of each individual session.

During session one all students were pretested on their ability to detect embedded inconsistencies. All students received instructions which were identical to the pretest procedure in Pilot Study 4. Students orally read and judged the eight pretest

Table 6

Outline of Procedure Used in Dissertation Study

Group Session

- a. Introduction
- b. Placement Test - (Standardized Reading Test)

Individual Session 1

- a. Pretest (8 passages; 4 error passages, 4 filler passages)

Individual Session 2

- a. Training (2 example passages; 1 error, 1 filler passage)
- b. Immediate Testing (8 passages; 4 error passages, 4 filler passages)

Individual Session 3

- a. Delay Testing (8 passages; 4 error passages, 4 filler passages)
- b. Posttest Interview

---

passages associated with their assigned packet number. The children were given as much time as needed to respond to each passage. Before leaving the children were told not to discuss any of the passages with their classmates. The entire pretest session took approximately twenty minutes.

Two experimenters administered the experimental treatments during sessions two and three, one of whom had previously administered all pretests during session one. The two experimenters during session two and three tested an equal number of students from each instructional condition at each reading ability level. Both experimenters were Caucasian females. One experimenter, the author, was an advanced doctoral student; the other experimenter was a master's level student. Scripts were written for each instructional condition to insure similar training presentations. Additionally, before any students were tested, the experimenters spent three sessions together practicing the training procedures (i.e., a total of six hours). Finally, to eliminate any further procedural discrepancies, the experimenters observed each other during one actual administration of each type of training.

Session two consisted of a training and immediate test phase. During the training phase, children received instruction corresponding to their assigned condition. The amount of training exposure was equivalent across the three conditions. The instructional package for all conditions consisted of four steps. The entire four-step procedure constituted one presentation of the instructional package. All students received a second presentation of the four-step procedure. Two example passages were employed during training, one with and one without an embedded error. One of the example passages was presented during each exposure to the four-step procedure. The presentation order of the sample passages was randomized across all conditions. (The example stories used during training can be found in Appendix A.)

The four-step procedure given to children in the two self-instruction conditions was similar to the Cognitive Behavior Modification procedure outlined by Meichenbaum (1975). The procedure is designed to promote the gradual internalization of instructions. One example passage was used repeatedly for each of the four steps.

In step one of the procedure, the experimenter modeled the self-directives associated with a particular condition and performed the corresponding example error detection task. During step two, the learner and instructor verbalized the self-directives together while performing the same example task. In step three, the learner performed the task once again only whispering the self-directives. Finally, in step four, the learner performed the task using covert self-instructions. The entire four-step procedure constituted one presentation of the instructional package. Each child was then taken through the four-step procedure a second time using a different example passage. Thus, children in the self-instruction condition received eight repetitions of the training strategy (i.e., four times with each of two passages).

When a child forgot any part of the procedure or if children gave an incorrect self-statement the examiner would immediately correct their performance and restart them on that step. Only eleven students required this extra prompting. All students displayed correct performances by the last step of the training procedure.

Children in the Control Didactic condition were also trained with a four-step procedure. During step one, the experimenter gave the instructions to the learner and read the corresponding example error detection task. During step two, the learner orally read the example passage and listened as the experimenter gave the instructions. In step three, the learner whispered the passage and listened as the experimenter explained what to do. Finally, in step four the learner read the same passage silently and again listened to the instructions presented by the experimenter. The same four-step procedure was repeated with the second example story. Thus, children in the Control Didactic condition were exposed to the training procedures and items an equal number of times as children in the self-instruction conditions. Children in the control condition, however, never engaged in any active self-verbalization.

The content of the instructions was similar across the three conditions. The instructions consisted of the five essential components proposed by Meichenbaum (1975): a task relevant statement, a guiding statement, a reinforcing statement, a monitoring statement, and feedback (presented respectively in this order). The children in the self-instruction conditions had the opportunity to internalize these statements while children in the didactic condition did not.

The instructional statements for each of the above components were exactly the same for the Neutral Self-Instruction and Control Didactic conditions but differed in the Specific Self-Instruction condition. The statements for the NS-I and C-D did not specify a specific standard of evaluation criterion whereas the self-statements of the SS-I condition specifically designated the type of problem to look for in a passage. The exact statements for each of the three conditions are presented in Table 7. The training scripts used for each condition can be found in Appendix D.

The training phase took approximately twenty-five minutes for each child. Immediately after training, all children were tested on their error detection performance with another set of

Table 7

Training Statements for Each Instructional Condition

Components of	Control Didactic	Neutral Self-Instruction	Specific Self-Instruction
Task Relevant: (a)	You should read the first two sentences and then stop to listen about what to do.	I will read the first two sentences and then stop to think about what to do.	I will read the first two sentences and then stop to think about the kind of problem to look for.
Guiding: (b)	You need to be finding problems. Like if there is something people might have trouble understanding.	I need to think of finding problems. Like if there is something people might have trouble understanding.	I need to think about finding ideas that are the opposite of each other. Like if one sentence in the story says one thing and then later another sentence says something opposite.
Reinforcing & Guiding: (c)	Good work (name). Now you should read the whole story from the beginning.	Good work (name). Now I will read the whole story from the beginning.	Good work (name). Now I will read the whole story from the beginning.
Monitoring: (d)	Did you find any problems?	Did I find any problems?	Did I find any ideas that were the opposite of each other?
Feedback: (e)	There is a problem part because here it says "B". So you should underline the sentence that has the problem. The confusing part here is "B".	There is a problem part because here it says "B". So I will underline the sentence that has the prolem. The confusing part here is "B".	There is a problem part because here it says "B". This part is opposite to the part that says "A". So I will underline the sentence that has the problem. The confusing part here is "B".

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eight passages. Children were presented the same immediate test instructions as in Pilot Study 4. Students were given as much time as needed to orally read and judge the eight passages. No student required more than twenty minutes to read all the passages. Before leaving, each child was told (s)he would return for one last session and was reminded not to discuss any of the procedures or passages with classmates. The entire training and immediate test session took approximately forty-five minutes.

The third session was held from seven to ten days after the training session for all but two children. For one child, session three was held twelve days after session two and for the other child session three was held three days after the training session. All students were tested on their error detection performance with another set of eight passages. Children in the two self-instructional conditions were reminded to use the thinking instructions but did not receive any review of the training procedure. Children in the didactic condition were simply reminded to think of the instructions given during the previous session. Each child was told:

> "Hi, I have some more stories to ask your help with today. Do you remember last week how you helped me decide if my stories were hard to understand? Well, I

> would like you to decide if there are any problems with these stories today, too. Please read the stories out loud. Try to remember to use (your thinking instructions) (the instructions) that we practiced last time.
>
> Underline any confusing parts. If everything is easy to understand, then don't underline anything. Some stories may have problems and some may not. Do you know what you are supposed to do?
>
> If you need help on reading any word just point to it and I'll read it for you. But you decide all by yourself if there are any problems in the story, OK? Here is the first story. Tell me when you are finished deciding."

After completing the error detection task, all students were given a postexperimental interview. Students in the two self-instructional conditions were asked questions regarding the use of the training and were asked to recall the components of the self-instructions. Additionally, students in all three conditions were asked how they felt about judging the stories. For the last question of the interview, students were asked to explain the meaning of opposite and to give some examples of opposites. All students' responses were recorded. An example of the postexperiment interview form can be found in Appendix E. The entire delay test session took approximately twenty minutes.

Chapter 5

Results

A child's error detection score was based on the number of errors correctly identified in the designated error passages. A score of one indicated that the target error sentence was underlined and the child's explanation of the error included the designated conflicting sentence information. If a) nothing in the error passage was identified as problematic, b) the error sentence was underlined but no reference was made to the contradictory information during the explanation, or c) other nonerror information in the passage was underlined, the child received a score of zero for that passage. Only two percent of the total 936 responses received a score of zero due to _b_ above, while six percent of the total responses received a score of zero due to _c_ above. All other responses were clearly right or wrong and no partial credit was given.

The passages were scored blindly with respect to the child's reading classification and experimental condition. Two judges independently scored all of the 936 error passages (i.e., twelve passages x 78 students). Only four scoring discrepancies were detected, all of which were resolved by the judges after further discussion.

Three separate scores (i.e., a pretest, immediate test, and a delay test error detection score) were calculated for every child by collapsing the scores obtained on the four error passages presented during each test time. For each test time a child's score could range from zero to four. The mean pretest, immediate test, and delay test performances and the standard deviation for each ability level and each condition are recorded in Table 8.

Next, the difference between the immediate test and pretest scores (i.e., Imm-Pre) was determined for each child to assess changes in error detection performances immediately after training. Finally, the difference between the delay test and pretest scores (i.e., Delay-Pre) was determined for each child to assess changes in children's performances a week after training. Larger differences are indicative of greater gains in performances. The mean gain score performances, and the standard deviation for each ability level and each condition are recorded in Table 9. All further analyses were conducted with the gain scores.

Since the relative effectiveness of each type of training was to be assessed on the basis of these performance gains, it was necessary to demonstrate that student's exhibited equivalent pretest performances across each condition. A two-way analysis of variance (condition by reading level) performed on the pretest performances alone indicated that across treatment conditions and

Table 8

Means and Standard Deviations on the Total Pretest, Immediate Test, and Delay Test Scores for Superior and Average Readers in Each Experimental Condition

Superior Readers

	Control-Didactic			Neutral Self-Inst.			Specific Self-Inst.		
	Pre	Imm	Delay	Pre	Imm	Delay	Pre	Imm	Delay
$\overline{X}$	.92	2.46	2.46	.77	2.46	2.54	.85	3.62	3.15
SD	1.32	1.39	1.66	1.30	1.39	1.56	1.34	.65	.90

Average Readers

	Control-Didactic			Neutral Self-Inst.			Specific Self-Inst.		
	Pre	Imm	Delay	Pre	Imm	Delay	Pre	Imm	Delay
$\overline{X}$	.31	.77	.85	.31	.85	1.77	.46	1.39	1.62
SD	.63	.60	.99	1.11	.90	1.64	.88	1.45	1.61

Table 9

Means and Standard Deviations on Immediate-Pre and Delay-Pre Gain Scores for Superior and Average Readers in Each Experimental Condition

Superior Readers

	Control-Didactic		Neutral Self-Inst.		Specific Self-Inst.	
	Imm-Pre	Delay-Pre	Imm-Pre	Delay-Pre	Imm-Pre	Delay-Pre
$\bar{X}$	1.54	1.54	1.69	1.77	2.77	2.31
SD	1.39	1.76	1.44	1.92	1.64	1.55

Average Readers

	Control-Didactic		Neutral Self-Inst.		Specific Self-Inst.	
	Imm-Pre	Delay-Pre	Imm-Pre	Delay-Pre	Imm-Pre	Delay-Pre
$\bar{X}$	.46	.54	.54	1.46	.92	1.15
SD	.78	1.13	1.39	1.56	1.38	1.28

$MS_{E\text{ Imm-Pre}} = 1.857$

$MS_{E\text{ Delay-Pre}} = 2.423$

ability levels there were no significant differences nor were there any significant interaction of condition by reading level on pretest performances. Therefore, it was concluded that the similar pretest performances of all students allowed equivalent room for improvements.

Separate and parallel analyses were conducted for the Immediate-Pre gain scores and the Delay-Pre gain scores. For both dependent measures a set of eleven parametric planned comparisons was examined (Dunn's, 1961, procedure). Over the eleven contrasts for each dependent measure there was a total familywise alpha rate of .15. This alpha-level is equivalent to the alpha distributed over an analogous two-way analysis of variance design with three [Conditions] by two [Abilities]. The hypotheses tested in this study can be categorized into three groups: (1) six pairwise comparisons between conditions within reading levels, (2) four pairwise comparisons between conditions across reading levels, and (3) one interaction comparison between training conditions and reading level. (See Table 10 for contrasts performed and the corresponding alpha levels).

There were three pairwise contrasts within each ability level (i.e., for a total of six) testing for the effects of training. For each of these contrasts, directional one-tailed comparisons were used, each conducted at an alpha level of .0167. Four pairwise contrasts were conducted to compare the performance gains of students

Table 10

Pairwise Comparisons Performed on Immediate-Pre and Delay-Pre Gain Scores Across Three Conditions and Two Reading Levels

Gain Score		Superior Comprehenders			Average Comprehenders		
Imm-Pre	Delay-Pre	Control	Neutral	Specific	Control	Neutral	Specific
		Didactic	Self-Inst.	Self-Inst.	Didactic	Self-Inst.	Self-Inst.
* ψ_1	ψ_7	-1		+1			
ψ_2	ψ_8	-1	+1				
ψ_3	ψ_9		-1	+1			
ψ_4	ψ_{10}				-1		+1
ψ_5	ψ_{11}				-1	+1	
ψ_6	ψ_{12}					-1	+1
** ψ_{13}	ψ_{17}	-1					+1
ψ_{14}	ψ_{18}	-1				+1	
ψ_{15}	ψ_{19}			-1			+1
ψ_{16}	ψ_{20}		-1			+1	
*** ψ_{21}	ψ_{22}		$+\frac{1}{2}$	$-\frac{1}{2}$		$-\frac{1}{2}$	$+\frac{1}{2}$

* Alpha level = .0167
** Alpha level = .005
*** Alpha level = .01

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with different reading levels. All of these contrasts were nondirectional, each conducted at an alpha level of .005. One interaction contrast tested if the type of self-instruction interacted with the reading level of the students. This directional interaction contrast was conducted at an alpha level of .01. Each of these eleven contrasts were performed separately on the mean immediate gain scores and the mean delay gain scores for a total of twenty-two contrasts. The description of the results will correspond to the above presentation order with the results of the immediate gain scores always preceding the results of the delay gain scores.

Contrasts Within Reading Levels

The immediate performance gains of students in each training condition were compared with one another to assess the effects of the different types of training. Each of these comparisons based on 72 error degrees of freedom was performed with $\alpha = .0167$.

Since specific predictions had been made regarding the effect of the specific self-instruction and the effect of neutral self-instruction versus didactic instruction, each of the three pairwise comparisons within each reading level were directional. Only one comparison, the Specific Self-Instruction group versus the Control Didactic group was significant, and this was true only for the superior readers with a $\underline{t}$ of 2.30. All remaining comparisons of the Specific Self-Instruction group versus the other two instructional groups and comparisons between the Neutral Self-Instruction group versus the Control Didactic group were nonsignificant. The t's were less than 2.01 in absolute value.

Therefore, immediately after training, superior readers who received the specific S-I instruction evidenced significantly greater improvements than students who received either the NS-I or C-D instruction. This was not the case for the average readers where all contrasts between conditions were nonsignificant.

The same pairwise contrasts between each training condition were performed on the delay gain scores for both reading levels. None of the six pairwise contrasts were significant, with all t's less than 1.51 in absolute value. Thus, one week after training there were no improvement differences between the instructional conditions. That is, students in all conditions displayed equivalent performance gains one week after training.

Contrasts Between Reading Levels

There were two non-directional comparisons made between average readers in each of the self-instruction groups versus the superior readers in the control group. Each of these comparisons based on 72 error degrees of freedom, was performed with an $\alpha = .005$. Neither of these comparisons was significant for either the immediate gain scores or delay gain scores. All t's were less than 1.87 in absolute value.

Two-nondirectional comparisons were made between average readers and superior readers in the two self-instructional conditions. Each comparison was based on 72 error degrees of freedom and performed with an $\alpha = .005$. The immediate mean performance gain of superior students in the Specific S-I condition was significantly greater than the immediate performance gain of the average students in the same condition, with a t of 3.45. However, there was no difference between the immediate performance gain of the superior and average students in the Neutral Self-Instruction condition.

After a week's delay period there were no differences between the mean performance gains of the superior and average students who received either type of self-training. All t's were less than 2.15 in absolute value.

Thus, the superior students improved more in their error detection performance as compared to the average students immediately after receiving the Specific S-I training but the significant difference between the two ability levels did not remain after a week's delay period. On the other hand, the better comprehenders who received the Neutral S-I did not evidence significantly greater performance gains than the average comprehenders in the same condition.

Interaction Contrast

Finally, the data were analyzed to assess if an interaction effect between type of self-instruction condition and ability was present. One directional interaction comparison was made for both the immediate and delay gain scores. Each contrast was performed at the .01 alpha level. Neither of these tests for interaction was significant with both t's less than 1.96 in absolute value.

Summary of Results

The results of this investigation can be summarized in light of the original hypotheses as follows:

1,2. For both the superior and average comprehenders there was no significant difference between the NS-I and C-D instruction. This was true for both the Immediate and Delay gain scores.

3,4. For the superior comprehenders, significantly greater performance gains were evidenced when students had received Specific S-I training in contrast to the C-D training immediately after training. For the average comprehenders, the performance gains evidenced by students receiving the SS-I training were equivalent to students receiving the C-D training. However, for both ability levels, there were no mean performance gain differences between the SS-I and C-D conditions after a week's delay interval.

5,6. The contrast between the two types of self-instruction was not significant within each group of students either immediately after training or one week later.

7. The contrast between the average readers who received specific self-training and the superior readers in the control

didactic condition was nonsignificant. This was true for performances tested immediately after training and after a week's delay period.

8. The contrast between the average readers who received the neutral self-training and the superior readers in the control didactic condition was nonsignificant. This was true for performances tested immediately after training and one week later.

9. The comparison made between the average and superior comprehenders who received the Specific self-instruction was significant. Superior readers in the SS-I condition demonstrated greater immediate performance gains than their less successful peers who received the same training. This superior improvement was not maintained after a week's delay period, however.

10. The comparison made between the superior and average comprehenders in the NS-I condition was nonsignificant indicating equivalent performance gains between the two groups of readers. This was true for both the immediate and delay gain scores.

11. There was no significant interaction found between the type of self-training and student's ability level. That is, the performance gain differences between the superior and average students did not change as a function of the type of self-instruction received. Again this result was true for both the Immediate and Delay gain scores.

Supplementary Analyses

Three additional questions were of interest in this study. Two questions concerned the children's responses to the posttest interview. The third question addressed whether children's comprehension monitoring performance was affected by the type of or placement of the error.

It will be remembered that students in the two self-instructional conditions were asked to recall the components of the self-instructions following the delay testing. One possible explanation for the limited effectiveness of the self-instructional training might be that students did not recall the self-statements to be employed. An inspection was made of the percentage of students in each self-training condition who recalled five or all six of the self-statements during the posttest interview (see Table 11). From an examination of Table 11, it appears that across all conditions and both ability levels, an average of only 60% of the students were able to recall five or six of the self-statements one week after training. This less-than-optimal recall of the self-directives may be one reason for the limited benefits of the self-instructional approach. However, if this was the case, one might expect to find a positive correlation between children's comprehension monitoring performances and recall of the self-statements. An inspection of Table 12, which displays these correlations for both groups of

Table 11

Number of Superior and Average Students Who Recalled Five or Six of the Self-Statements and the Associated Percentages by Condition

	Neutral Self-Instruction		Specific Self-Instruction	
	N=*	%	N=	%
Superior Comprehenders	9	69	10	77
Average Comprehenders	7	54	6	47

*Total Number of Students = 13 per condition

Table 12

Correlations Between Superior and Average Students' Immediate and Delay Comprehension Monitoring Performance and Recall of the Self-Statements by Condition

	Neutral Self-Instruction		Specific Self-Instruction	
	Immediate	Delay	Immediate	Delay
Superior	-.03	-.47	-.04	.43
Average	.20	-.06	.01	-.15

students, does not support this explanation; no significant linear relationships were found. In fact, the low and negative correlations obtained suggest that this recall measure was not related or was inversely related to students' comprehension monitoring performances. Therefore, alternative explanations are needed to explain why the self-instruction employed in this study was not more effective than the didactic instruction.

The second question of interest concerned the children's knowledge of the standard of evaluation criterion necessary for successful error detection. Student's responses to Posttest Interview question six were analyzed in order to determine if there were differences in the children's knowledge of "opposite concepts" across conditions and ability levels. Although pilot study three suggested that children of this age should have no difficulty understanding the 'opposites' relation, it is still possible that the children in the final sample of the study proper did experience some difficulty.

A response was given a score of one if a child gave either a correct definition or example of an opposite pair of words. All other responses received a score of zero. Two judges, unaware of the group and ability level of the subjects scored all of the 936 responses. An interrater agreement of 98% was obtained.

The total number of students receiving a score of one on Posttest Interview question six and the corresponding percentage for each condition and ability level is shown in Table 13. There appear to be no overall differences between the percentage of superior and average comprehenders in the Control-Didactic condition who demonstrate knowledge of opposite concepts. There was perfect performance in these conditions. However, the average readers in the two self-instruction conditions, answered the question more inadequately than did the superior readers. In other words, fewer average readers, who received the self-instructional training appeared to have a good understanding of opposites.

This might suggest that identification of the oppositional errors employed in this study would be more difficult for these students. Additionally, one would not expect these students to benefit from a cue to look for opposite ideas in the passage which in turn would tend to undermine the effectiveness of the specific self-instruction. On the other hand, it may simply indicate that the less successful students in these two conditions are not as adept at verbal explanations which may or may not hinder their error detection performances.

The third supplementary analysis questioned whether the children's error detection performances varied as a function of where the actual error was placed in the text or the type of error it was. Table 14 displays the number of antonym and negation errors detected by the superior and average readers in each instructional

Table 13

Number of Superior and Average Students Who Received a Score of One for Posttest Interview Question Number Six and the Associated Percentages by Condition

	Control Didactic		Neutral Self-Instruction		Specific Self-Instruction	
	N=*	%	N=	%	N=	%
Superior Comprehenders	13	100	12	92	13	100
Average Comprehenders	13	100	7	53	10	76

*Total Number of Students = 13 per condition

Table 14

Number of Antonym and Negation Errors Detected by the Superior and Average Students by Condition

		Control Didactic				Neutral Self-Instruction				Specific Self-Instruction			
		Pre*	Imm*	Delay*	Total	Pre	Imm	Delay	Total	Pre	Imm	Delay	Total
SUP	Antonyms	7	15	17	39	6	19	15	40	8	23	23	54
	Neg/Syn	5	17	15	37	4	13	18	35	3	24	18	45
AVE	Antonyms	3	3	6	18	2	4	12	18	2	11	11	24
	Neg/Syn	1	7	5	13	2	7	11	20	4	7	10	21

*Number of errors detected from a possible total of twenty-six errors.

condition. Table 15 displays the number of errors detected by the superior and average readers in each instructional condition depending on whether it occurred in the middle or the end of the passage. No statistical analyses were performed on these scores. An informal examination of Tables 14 and 15 can be made, however, to determine whether systematic differences were found between the two types of errors or between the two types of error placements.

In terms of the type of embedded error, there appears to be a greater total number of antonym errors than negation errors detected (see Table 14). This is true for all groups of students except the average students in the Neutral Condition. Thus, it may be the case that antonym errors are inherently easier to detect than negation errors. However, this conclusion is tempered by the fact that only small differences between the antonym and negation errors were obtained during each test time.

Conclusions regarding the ease with which students detect errors placed in the middle or at the end of a text can be drawn after an inspection of Table 15. It appears that more errors were detected when they occurred at the end rather than in the middle of a passage. This was true for all students across all conditions. Additionally, this pattern was consistently evidenced during each test time. From these results it can be concluded that the placement of the error in the text does affect students' comprehension monitoring performances.

Table 15

Number of Middle and End Errors Detected by the Superior and Average Students by Condition

		Control Didactic				Neutral Self-Instruction				Specific Self-Instruction			
		Pre*	Imm*	Delay*	Total	Pre	Imm	Delay	Total	Pre	Imm	Delay	Total
SUP	Middle	4	15	15	34	4	13	13	30	5	21	20	46
	End	8	17	17	42	6	19	20	45	6	26	21	53
AVE	Middle	2	6	4	12	2	2	8	12	2	7	9	18
	End	2	4	7	13	2	9	15	26	4	11	12	27

*Number of errors detected from a possible total of twenty-six errors.

It appears that fifth grade readers will be more likely to detect the 'between-sentence' error when the contradictory sentence occurs at the end of a passage. The greater ease of detecting errors at the end of a text is evidenced in spite of the fact that there is a larger number of intervening sentences between the target error and the sentence it contradicts when the error is placed at the end rather than the middle of the passages.

Thus, it appears that children's error detection performances do vary as a function of the type of error present or the placement of the error in the text. Moreover, the variation in performances due to the error type and error placement is consistent across each training condition and for each reading ability level.

Chapter 6

Discussion

The general purpose of this study was to determine whether a self-instructional training approach would be successful in promoting children's comprehension monitoring performances during reading. Previous studies with school aged children have shown that successful comprehension monitoring abilities during reading are not evidenced until later in the elementary school years (Baker & Brown, 1981; Baker & Brown, in press; Markman, 1977, 1979). Moreover, past research suggests that less successful readers display relatively greater deficiencies in comprehension monitoring performances in contrast to their more successful peers (Garner, 1980-1981; Kaufman, 1981; Katsonis & Patterson, 1980; Ryan, 1981). Immature readers often are not aware of their failures to comprehend and do not efficiently detect major blocks to comprehension progress. This was found to be especially true when the obstacles purposely presented in passages required the integration of information across sentences (Garner, 1981; Garner & Kraus, 1980; Garner & Taylor, 1982; Markman, 1979; Pace, 1980, 1981).

Although several explanations regarding inefficient monitoring have been posed, few studies have investigated instructional strategies which might lead to more successful performances in young children. The present study was designed to determine whether a self-instructional training approach could be employed to facilitate comprehension monitoring performances in fifth-grade readers. Two types of self-instruction were investigated with students exhibiting either superior or average comprehension abilities. Additionally, the effects of each type of training were assessed over time.

As noted earlier, one group of questions addressed by the study reported here pertain to the effect of self-instruction: (1) Does the employment of a self-instructional strategy facilitate increased comprehension monitoring performances as compared to equivalent teacher-directed instruction? (2) Does a more explicit variation of self-instruction which includes a specific standard of evaluation criterion promote increased comprehension monitoring performances in comparison to equivalent didactic instruction? (3) Does the inclusion of a specific standard of evaluation criterion within a self-instructional format promote greater improvements than less explicit self-instructional training? Each of these questions was examined with students who were superior comprehenders and students who were classified as average comprehenders.

The second set of questions addressed by the study reported here pertain to the performance differences between superior and average comprehenders: (4) Do average readers who have received either type of self-instruction display improvements in their error detection performances equal to that of superior readers who have received didactic instruction? (5) Do superior and average students who receive the same self-instruction strategy training differ in their level of improvement?

The first question concerns the effect of self-instruction relative to equivalent didactic instruction. The overall results of this study do not support the contention that self-instructional training promotes greater comprehension monitoring performances than a didactic teacher-directed approach. All students displayed similar improvements on the number of errors successfully detected after receiving the control didactic or the equivalent neutral self-instruction both immediately after training and one week later. Thus, the present study does not support the results of previous research which demonstrated that self-instructional training was more effective than didactic instruction with perceptual-motor tasks (Meichenbaum & Asarnow, 1981; Meichenbaum & Goodman, 1971; Schleser, Meyers, & Cohen, 1981) and with reading comprehension tasks (Bommarito & Meichenbaum, 1978; Short, 1981).

On the other hand, in reference to question two, self-instruction did elicit significantly greater comprehension monitoring improvements than didactic instruction when a specific standard of evaluation criterion was incorporated within the self-statements. Only the superior comprehenders displayed significantly greater improvements with the inclusion of a specific task criterion, however. Apparently, for the superior readers the active self-regulation in conjuntion with a specific standard of evaluation promoted greater improvements than the didactic instruction. This was not the case with the average comprehenders. Average students did not benefit any more from the self-training that included an evaluation criterion than from the didactic training. This result is consistent with past work which has shown that older and better readers do benefit when given a specific evaluation standard (Baker & Anderson, 1982; Markman, 1979; Glenberg, et al., 1980).

An alternative explanation for the limited improvement of the average readers in the SS-I condition comes from an inspection of the children's responses to question six on the Posttest Interview (see Table 13). For this question, all children were asked to define and give an example of opposite words. Only 76% of the average students in SS-I condition were able to respond correctly as compared to 100% of the superior students. Thus, the average students may not have understood the standard of evaluation criterion required for the task. In order to assess whether average readers can benefit from the inclusion of a standard of evaluation criterion, future work must assure that all students understand the criterion which is provided during instruction.

The significantly greater performance gains obtained by the children in the Specific Self-Instruction group does lend support to the idea that self-instruction is more effective than didactic instruction. But the significance of this finding is tempered by at least two other facts. First, the greater improvement promoted by the Specific Self-Instruction condition relative to the other conditions was not maintained. The performance gains of the superior readers in the SS-I condition decreased over time while the gains of children in all other conditions improved. Thus, students in all training conditions displayed equal performance gains when tested one week later.

Secondly, one must be careful not to conclude prematurely that self-instruction was effective since the provision of the specific evaluation standard might have accounted for the increased improvement. In fact, this latter explanation has been supported by past work which demonstrates that a specific standard of evaluation criterion improves children's performances on other monitoring tasks (Markman & Gorin, 1981). In order to conclude that a self-instructional strategy aided comprehension monitoring, an evaluation standard would need to be included within a didactic control condition. Thus, more work is needed to pinpoint the contributions of the self-training components.

In reference to question three, no differences were found between the performance gains of students in each of the self-instruction groups. At no time did the performance gains of students in the SS-I condition significantly exceed the performance gains of students in the NS-I condition. The inclusion of a standard of evaluation criterion increased the better reader's comprehension monitoring efficiency only in contrast to readers who received the didactic training but not in contrast to readers who received another self-instructional training variation.

In summary, the results of the study reported here do not provide strong support for the contention that self-instructional training may be more beneficial than didactic training in promoting greater improvements in the comprehension monitoring performances of young children. It appears that students of both ability levels exhibited very low comprehension monitoring performances in the pretest and then increased their performance uniformly after either didactic or self-instructional training. It should be noted, however, that the sustained or continued improvements in children's comprehension monitoring performances over time cannot be fully attributed to any of the training procedures in this study. Children may have evidenced as much improvement with a simple reexposure to the task. An additional reexposure control group would be needed to determine if the training procedures utilized in this study promoted any greater improvements than additional practice with the task.

A more optimistic picture is painted regarding the effects of self-instructional training when a closer examination is made of students' actual performance levels after training. Table 16 displays the percentage of students in each condition (n=13) who obtained scores of three or four (out of a total of four) on the Immediate and Delay Test.

Inspection of these results shows that a higher percentage of students in the self-instructional conditions were detecting most of the errors. Even though all children evidenced improvements in their error detection performances after training, the self-instructional training seemed to increase student's accuracy more than the didactic training. Thus, the benefits of the self-instructional training may have been obscured through the analysis on the gain scores alone. It would seem, though, that the possible insensitivity of the gain score analysis does not fully account for the limited effects of the self-instructional training in this study.

Another explanation that may account for these results concerns possible inadequacies of the self-instructional training procedures and/or limitations of the error detection paradigm which formed the basis for this conclusion. Before discussing these limitations, however, the performance gain contrasts between the two groups of readers will be presented.

Contrasts were made between students exhibiting superior and average reading comprehension abilities to determine whether

Table 16

Number of Superior and Average Students Who Obtained a Score of Three or Four on the Immediate and Delay Test and Associated Percentages by Each Instructional Condition

	Control Didactic				Neutral S-I				Specific S-I			
	Immediate		Delay		Immediate		Delay		Immediate		Delay	
	N=*	%	N=	%	N=	%	N=	%	N=	%	N=	%
Superior Comprehenders	7	54	7	54	8	62	9	69	12	92	9	69
Average Comprehenders	0	0	1	7	1	7	5	38	3	23	5	38

*Total Number of Students = 13 per condition

self-instruction promoted equivalent improvements in both groups of students. It was anticipated that self-instruction would encourage more efficient strategy use in average comprehenders and thus enable them to display equivalent gains in their comprehension-monitoring performances as their more successful peers.

In reference to question four, it was predicted that the performance gains of the average readers who received self-instruction would not differ from the performance gains of the superior readers who received didactic training. The results did support this hypothesis in that the average readers did not significantly differ from their more successful peers, but, descriptively the average readers always displayed a lower level of improvement as compared to the superior readers.

In reference to question five, contrasts were made between the performance of the superior and average readers receiving either type of self-instructional training. Performance gain differences were not found between the average and superior readers in the Neutral Self-Instruction condition. That is, average comprehenders did not differ from the superior comprehenders in their ability to utilize the neutral self-instruction to improve their comprehension monitoring performances.

On the other hand, specific self-instruction promoted greater performance gains for the better readers. That is, the superior comprehenders outperformed the average comprehenders when presented a specific evaluation criterion within a self-instructional format. These findings are consistent with previous studies by Markman (1979) and Markman and Gorin (1981) which found that older students benefitted more from the provision of a criterion to guide their monitoring than younger students. In addition, this outcome supports the study by Garner and Anderson (1982) which found that an explicit instructional set did not facilitate the error detection performance of poor readers. It appears that the less successful readers do not benefit from the inclusion of specific evaluation criterion to the same extent as their more successful peers. As mentioned previously, however, the less successful readers (i.e., average readers) in this study may not have understood the criterion that was provided during training. It remains to be seen whether ability differences will or will not persist when the standard of evaluation criterion provided is one which is equally familiar to both groups of readers.

Finally, the predicted interaction between the type of self-instruction and reading level was not found. Differences between the improvements evidenced by the two groups of readers did not change as a function of the type of self-instructional training. Again this result suggests that the average readers displayed equivalent performance gains as their more successful peers.

In summary, in all but one contrast average readers who received self-instruction showed as much improvement as their more successful peers. Thus, the self-instructional approach employed in this study may have allowed the average readers to adopt more active self-regulation processes enabling them to display equivalent performance gains as the superior readers. However, this conclusion cannot be justified solely on the basis of these results. One reason for this caution is that the comprehension monitoring performances of the two groups of readers did not significantly differ before training was initiated. Additionally, the previous finding that students displayed equivalent gains in performance after receiving either the control or self-instructional training argues against the conclusion that self-instruction alone accounted for the equivalent ability performances.

Moreover, an inspection of Table 8 demonstrates that the successful readers' mean performances on the Immediate and Delay test are consistently greater than the less successful readers. Thus, even though there were no significant performance differences, after training the superior readers consistently detected a greater number of errors than the average readers.

There are several possible explanations for the limited benefits of self-instructional training found in this study which will be discussed in the following section.

Limitations

Several factors may limit the validity and generalizability of the results in the present study. Potential limitations will be discussed in terms of the choice of population studied, the training and methodology employed, and the potential shortcomings of the error detection paradigm.

The differences in subject populations used in the various studies investigating comprehension monitoring abilities may account for the nonsignificant training effects found in this study. Methods of assessing reading ability vary greatly across studies. Moreover, this problem is compounded by the fact that there does not exist a homogeneous classification of poor readers. It should be noted that the population of average readers included in this study is not representative of the poor readers in past studies. In fact, the average comprehension grade level score for the average fifth-grade readers in this study was 4.89. This grade level equivalency cannot be considered a below average reading performance based on national norms. Thus, it is likely that the average comprehenders included in this study are more similar to the better readers in past studies. And, it is possible that a self-instructional training approach may not be as effective with better readers.

Secondly, several factors regarding the adequacy of the training procedure employed in this study may account for the ineffectiveness of the self-training procedure. It might be argued that children were not successful at employing the self-instructional strategy they were taught. As described in the methods section, the last step of the self-instruction training procedure was a covert application of the self-statements by the child. Possibly, the children were not accurately applying the self-statements during this stage. No actual check was made when the child utilized the instructions covertly. The experimenter only listened while the child practiced the self-statements outloud. Thus, the limited success of this approach could have stemmed from children's difficulty in applying the self-instruction covertly.

It is also feasible that the limited training procedure (i.e., one session) may not have been enough to promote efficient utilization of this strategy. The decision to train students in one session had been based on the successful results of the pilot study as well as practical time restrictions. In order to insure a more adequate assessment of the effects of self-instruction, future investigations need to employ an extended training procedure and include a means of assessing the child's utilization of the trained strategy. In fact, explicit routines to check one's success at employment of the strategy might be incorporated into the self-instructional strategy. Brown and her colleagues have recently suggested that with more difficult concepts and particulary with immature readers, explicit training in strategies should be coupled with routines to oversee the successful application of those strategies (Brown, Campione, & Day, 1981). The training in this study was further limited because it did not provide an explanation of the strategy's applicability. Strategy maintenance and generalization are more likely to be obtained when the training procedures include explanations concerning the reasons why such strategies are useful (Brown, 1978). Given these various possiblities, which may have limited the effectiveness of the self-training procedure, only tentative conclusions should be drawn about the actual benefits of self-instruction.

Differences in the experimental procedures utilized in the various studies investigating the comprehension monitoring abilities of children could also account for the present findings. That is, past studies utilizing the error detection paradigm typically do not evaluate children's spontaneous improvement in comprehension monitoring performances. For example, in the Markman and Gorin (1981) and Garner (1980) studies an assessment of children's comprehension monitoring was made after a single practice trial. The pre-post test design of the present study provided students with additional practice and exposure to the task. It may be that the re-exposure alone accounted for the general improved performances for all students. Unfortunately, the present experimental design cannot effectively rule out this possibility since a simple 're-exposure-with-feedback' control group was not included.

Finally, the nonsignificant effects of the self-instructional approach could be attributed to the shortcomings of the error detection paradigm. Although the directed underlining detection measure used in this study provides a better index of monitoring ability than previous Markman-type error awareness interviews (Baker & Brown, in press; Kaufman, 1981; Paris & Meyers, 1981), several issues remain problematic (Winograd & Johnson, 1980). Of greatest concern here is the possibility that the error detection task is not sensitive enough to detect monitoring activities on the part of the learner. Five major difficulties with this paradigm, as they pertain to the present study are as follows.

First, poor performances on the error detection task may not be representative of correspondingly poor monitoring abilities. For example, young students may overlook errors or "suspend their disbelief because much of what they have read is unbelievable" (Winograd & Johnson, 1980). Older students may overlook errors because they believe that writers adhere to the Cooperative Principle which implies that writers intend their messages to be truthful and unambiguous (Grice, 1977). In fact, subjective reports by adults have indicated that subjects may: (1) assign alternative meanings to a text, (2) assume a writer has made a mistake and ignore the error, or (3) use 'fix-up strategies' (e.g., make inferences) to resolve the errors (Baker, 1979; Baker & Brown, in press; Garner & Alexander, 1981). However, these problems were alleviated to some extent in the present study since all students were explicitly told to look for errors.

Secondly, the ambiguity of the typical 'be-a-consultant' or 'be-an-editor' instructions may confuse students or may lead students to adopt different goals rather than the ones necessary for task completion (Baker, 1979; Winograd & Johnson, 1980). The fact that students in this study appeared to improve in their error detection performance following a simple explanation and practice trial (i.e., didactic training) would lend support to this idea. Moreover, spontaneous improvements have been noted in two recent studies in which a repeated exposure design was employed (Baker & Anderson, 1979; Winograd & Johnson, 1980). Further work is needed to assess whether this improved performance was due to a better understanding of the task, an increased rapport with the examiner, or increased comfort with the testing situation.

The experimental materials employed within an error detection paradigm represent the third area of concern. Recent work has shown that student's comprehension monitoring performances are influenced by the kind of errors and the location of the errors included in a text (Baker, 1982; Garner & Anderson, 1982). These two factors have varied tremendously across and even within many previous studies (Baker, 1979; Markman, 1977, 1979; Garner, 1980). The characteristics of the materials employed are especially problematic when generalizing beyond the scope of an individual study. Differences between materials included in the same study may also account for the presence of intra-individual and individual differences (Baker & Anderson, 1982). The passages employed in the present study were carefully constructed to control for variation in target error type and placement. However, the method of assigning stories to students did not allow for a direct examination of passage effects based on the content of the passage. Future work needs to examine systematically how readers, treatments, and materials interact during comprehension monitoring processes.

The fourth limitation of the error detection paradigm lies in the dilemma of attempting to externalize complex mental events (Brown, 1980; Nisbitt & Wilson, 1977). Verbal reports have been routinely employed to study comprehension monitoring abilities in children. Unfortunately, past work has shown that students may fail to report actual strategies they are capable of employing (e.g., as in instances where readers are not verbally facile -- Brown, 1978) or conversely, may report using behaviors they do not demonstrate using (Brown & Lawton, 1977; Garner & Reis, 1981). Although the directed underlining method employed in this study, minimized the verbalization required by a child, it is possible that the young students in this study were not verbally facile enough to explain the identified errors.

Finally, the fifth difficulty attributed to the error detection paradigm is that students may be reticent about criticizing the experimenter (Markman, 1979; Winograd & Johnson, 1980). This criticism had been countered in the present study by having several sessions over which the students were seen, by clearly designating the nonevaluative nature of the task, and by having the same experimenter/child pairings during training and posttesting. Moreover, when all children were questioned about their reaction to the procedures during the posttest interview (i.e., question number five), the majority of the students (i.e., 73 out of 78 -- 95%) said that they did not feel "uncomfortable or bad" about pointing out problems in the passages. Of course, the possibility still exists that students may not have candidly admitted to their uneasiness.

In conclusion, it is likely that the error detection task employed in this study was not a sensitive indicator of a child's metacognitive abilities. Several alternative comprehension monitoring paradigms have been recently employed including; eye movement technology (Baker & Anderson, 1982; Harris, Kruithof, Terwogt, & Visser, 1981), assessment of nonverbal behaviors (Flavell, Speer, Green, & August, 1980), documentation of studying or rereading behaviors (Garner & Reis, 1981; Baker & Brown, in press), and asking readers to assume teaching roles during a reading task (Garner, Wagoner, & Smith, in preparation). Each methodology has its own contributions to make and its own limitations. Future work is needed with a variety of measures to seek converging evidence of comprehension monitoring skills and to seek evidence that self-instructional approaches are a viable means of promoting these skills in young children.

Future Research and Educational Implications

The preceding limitations are important considerations for future research with comprehension monitoring training. Although the self-instructional approach employed here did not differentially enhance comprehension monitoring performance gains, the means suggested that, especially for the average readers, the self-instructional groups were better able to detect embedded text errors than the didactic training groups. There appear to be many possible and interesting extensions of the study reported here. Perhaps a more extensive self-training procedure with a variety of materials and feedback regarding the utility of the technique would facilitate further recommendations regarding the applicability of self-instructional approaches to comprehension monitoring training (Belmont & Butterfield, 1977; Brown, Campione, & Barclay, 1979; Brown, Campione, & Day, 1981). In order to accomplish this aim, students could be given self-statements which address the functional relationship between use of the self-instructional strategy and improved comprehension monitoring performances. Similarly, to foster more cognitive awareness, children could be taught to ask themselves questions about their cognitive activities before, during, and after learning activities. The desired end-product is that the self-interrogation strategy would help the student become more aware of possible comprehension problems, and in turn, take the necessary steps to repair their understanding (Brown, 1975; Ryan, et al., 1982; Singer, 1978; Singer & Donlan, 1982). Finally, the benefits of self-instructional training approaches could be assessed using several different comprehension monitoring paradigms (Baker, 1982; Garner & Anderson, 1982).

It is only in recent years that researchers have considered comprehension monitoring an essential aspect of reading comprehension (Baker & Brown, 1981; Forrest-Pressley, in press; Yussen, et al., 1982). The importance of finding methods to enhance children's employment of metacognitive abilities during reading cannot be overlooked. To date, very few studies have investigated the effects of self-instructional training on promoting effective comprehension monitoring during reading. Limited research has shown that it might be possible to teach self-training routines which increase children's ability to orchestrate, monitor, and check ongoing reading activities (Baker & Brown, in press; Short, 1981). Thus, the possibility of employing self-instructional training to improve more effective comprehension monitoring performances, especially in problem readers, deserves further systematic evaluation.

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Appendix A

Error Stories, Filler Stories, and Example Stories Used in Final Experiment

TRAINING EXAMPLE

ERROR STORY

SUZIE

I HAVE A FRIEND NAMED SUZIE. SHE LIVES NEXT DOOR TO ME. SUZIE IS A VERY TINY BABY. SHE DRINKS A LOT OF MILK FROM A BOTTLE. SHE TRIES TO PLAY WITH EVERYTHING. ONE OF HER FAVORITE TOYS IS A SOFT BEAR. SHE HUGS THE BEAR A LOT. SUZIE DOES MANY OTHER THINGS. BECAUSE SUZIE IS A BIG GIRL, SHE GETS TO DO MORE.

ERROR STORY

NEGATION-MIDDLE

CAMP

CAMP STAR LAKE IS A SUMMER CAMP FOR CHILDREN. PEOPLE WHO WORK THERE ARE CALLED COUNSELORS. MANY OF THE COUNSELORS AT STAR LAKE ARE TEENAGERS. CAMP STAR LAKE ONLY HIRES COUNSELORS WHO HAVE LEARNED TO SWIM. THERE ARE MANY COUNSELORS HIRED EACH SUMMER. IT IS A GOOD JOB FOR A TEENAGER. MOST COUNSELORS AT STAR LAKE DO NOT KNOW HOW TO SWIM. A COUNSELOR MUST LIKE TO WORK WITH CHILDREN. THE COUNSELOR'S JOB IS TO HELP PLAN THINGS TO DO.

ERROR STORY

NEGATION-MIDDLE

OYSTERS

OYSTERS ARE TINY SEA ANIMALS THAT BELONG TO A GROUP CALLED MOLLUSKS. LIKE ALL MOLLUSKS, OYSTERS HAVE SOFT BODIES. THE OYSTER LIVES INSIDE OF A SHELL. LOTS OF ANIMALS LIKE TO EAT OYSTERS. THE HARD SHELL PREVENTS ANIMALS FROM EATING THE OYSTER. OYSTER SHELLS LOOK LIKE ROCKS. THE SHELL HAS A HINGE SO IT CAN OPEN AND CLOSE. BUT THE SHELL DOES NOT STOP ANIMALS FROM EATING THE OYSTER. THE OYSTER OPENS THE SHELL TO FIND FOOD. TINY PLANTS FLOAT INTO THE OPENED SHELL. THE OYSTER FEELS THEM AND CLOSES THE SHELL.

ERROR STORY

NEGATION-MIDDLE

STUNT PEOPLE

STUNT PEOPLE ARE OFTEN USED IN THE MOVIES. AND THEY DO SOME VERY EXCITING THINGS. STUNT PEOPLE TAKE RISKS FOR THE MOVIE STARS. HAVE YOU EVER SEEN A CAR CHASE IN A MOVIE? A STUNT PERSON USUALLY DRIVES THE CAR INSTEAD OF THE MOVIE STAR. BUT STUNT PEOPLE NEVER TAKE CHANCES FOR ANOTHER PERSON. BOTH MEN AND WOMEN DO STUNTS. THEY GET PAID A LOT OF MONEY. THEY CAN GET MANY DIFFERENT KINDS OF STUNT JOBS.

ERROR STORY

NEGATION-END

FISH

FISH COME IN ALL SIZES AND SHAPES. THERE ARE MANY DIFFERENT TYPES OF FISH. SOME FISH LIVE WAY DOWN AT THE BOTTOM OF THE OCEAN. TO GET TO THE BOTTOM FISH MUST SWIM DOWN VERY DEEP. THERE IS NO LIGHT AT THE BOTTOM OF THE OCEAN. THE FISH FIND MANY PLACES TO HIDE. THERE ARE MANY CAVES TO HIDE IN. THE FISH ALSO FIND A LOT TO EAT DOWN AT THE BOTTOM. THE FISH AT THE BOTTOM KNOW JUST WHAT TO EAT. THE RAYS FROM THE SUN HELP THE FISH TO FIND FOOD AT THE OCEAN BOTTOM.

ERROR STORY

NEGATION-END

HUMMINGBIRD

A HUMMINGBIRD IS AN INTERESTING BIRD. WHEN FULLY GROWN IT IS ONLY TWO INCHES LONG. THIS LITTLE BIRD IS NOT AFRAID OF ANYTHING. THE WINGS ON THE BIRD BEAT VERY FAST. THE WINGS BEAT SO FAST THEY MAKE A HUMMING SOUND. THIS IS HOW THE HUMMINGBIRD GOT ITS NAME. THIS BIRD CAN HANG IN MIDAIR. IT CAN ALSO FLY BACKWARDS AND SIDEWAYS. ONE REASON THE HUMMINGBIRD MOVES SO FAST IS THAT IT GETS EASILY SCARED.

ERROR STORY

NEGATION-END

RAT

A KANGAROO RAT IS A SMALL ANIMAL. IT LIVES IN THE DESERT. THE RAT MOVES BY HOPPING LIKE A KANGAROO. THE RAT CAN TAKE A BIG JUMP AND TURN AROUND IN THE AIR. OTHER ANIMALS ARE NOT ABLE TO GRAB THE KANGAROO RAT. KANGAROO RATS ARE OFTEN SEEN IN LARGE GROUPS. THE RATS LIVE TOGETHER IN PACKS. THEY ALSO TRAVEL IN PACKS. FOR FOOD, THEY EAT SMALL INSECTS. KANGAROO RATS ARE CAUGHT EASILY BY DESERT ANIMALS.

ERROR STORY

ANTONYM-MIDDLE

HOUSES

HOUSES CAN BE BUILT OF MANY THINGS. THE WAY A HOUSE LOOKS HAS A LOT TO DO WITH WHAT IS PUT ON THE OUTSIDE. TWO THINGS USED FOR THE OUTSIDE OF HOUSES ARE WOOD AND ALUMINUM. ALUMINUM IS A CHEAP METAL. A LOT OF PLANNING IS NEEDED BEFORE A HOUSE IS BUILT. PEOPLE MUST PICK THE MATERIALS TO BE USED. IT WOULD BE EXPENSIVE TO BUY ALUMINUM FOR THE SIDES. WHEN THE PLANS ARE MADE THE BUILDERS CAN BEGIN. THEY FOLLOW THE PLANS CAREFULLY.

ERROR STORY

ANTONYM-MIDDLE

IRELAND

IRELAND IS A COUNTY IN EUROPE. IT IS ON A SMALL ISLAND. THE COUNTRY'S COLOR IS GREEN. IRELAND IS KNOWN FOR ITS RAINY CLIMATE. MANY PEOPLE GO TO IRELAND EACH YEAR. THE LAND IS HILLY AND IT IS VERY BEAUTIFUL. PEOPLE WHO VISIT LIKE THE DRY WEATHER. IRELAND ALSO HAS A LOT OF CASTLES. SOME OF THE CASTLES ARE VERY OLD. PEOPLE LIKE TO VISIT IRELAND FOR THESE REASONS.

ERROR STORY

ANTONYM-MIDDLE

JOURNAL

MY FRIEND BILL AND I ARE KEEPING A JOURNAL ABOUT HAMSTERS. THE JOURNAL WILL BE OUR SCIENCE FAIR PROJECT FOR NEXT YEAR. BILL AND I OWN TWO HAMSTERS. HAMSTERS ARE INTERESTING. THEY SLEEP DURING THE DAY AND PLAY AT NIGHT. WE WATCH OUR HAMSTERS. THEN WE WRITE DOWN EVERYTHING WE SEE. DURING THE DAY WE GET TO WATCH THEM PLAY. THIS PROJECT IS A LOT OF FUN. WE WILL BRING OUR HAMSTERS WHEN WE GO TO THE FAIR NEXT YEAR.

ERROR STORY

ANTONYM-END

DIAMONDS

DIAMONDS ARE PRECIOUS GEMS. A DIAMOND IS DUG OUT OF THE GROUND. IT IS ONE OF THE HARDEST STONES IN THE WORLD. DIAMONDS ARE OFTEN USED IN JEWELRY. THEY ARE PUT INTO RINGS AND BRACELETS. DIAMOND JEWELRY IS VERY EXPENSIVE. BUT MANY PEOPLE WILL BUY IT ANYWAY. THEY LIKE THE WAY THAT DIAMONDS SPARKLE IN THE LIGHT. PEOPLE WHO MAKE DIAMOND JEWELRY ARE CALLED JEWELERS. JEWELERS THINK THAT THE SOFT STONE IS EASY TO WORK WITH.

ERROR STORY

ANTONYM-END

ICEBERG

ICEBERGS ARE "BORN" IN THE COLDEST PARTS OF THE WORLD. IN THESE PARTS OF THE WORLD THE GROUND IS COVERED WITH ICE. THE ICE SLIDES OVER THE GROUND TO THE OCEAN. THEN THE WAVES BREAK OFF LARGE PIECES OF THE ICE. THE ICEBERG FLOATS IN THE WATER. BOATS KEEP FAR AWAY FROM THE FLOATING ICE. ALL ICEBERGS ARE NOT THE SAME SIZE. SOME ARE AS LARGE AS MOUNTAINS. ICEBERGS ARE OFTEN CALLED FLOATING GIANTS. ONLY A SMALL PART OF AN ICEBERG IS SEEN ABOVE WATER. BOATS MOVE NEAR AN ICEBERG WHEN PASSING IT.

ERROR STORY

ANTONYM-END

WORMS

SOMETIMES CHILDREN RAISE EARTHWORMS. THEN THEY SELL THE WORMS TO MAKE MONEY. MANY PEOPLE WILL BUY WORMS. AND IT IS NOT HARD TO RAISE THEM. EARTHWORMS WILL EAT MOST KINDS OF FOOD. JUST DIG UP SOME WORMS AND PUT THEM IN A BOX. THEN PUT SOME HAY IN THE BOX. PUT SOME DIRT IN THE BOX TOO. PUT ROCKS UNDER THE CORNERS OF THE BOX TO KEEP IT OFF THE FLOOR. DO NOT FORGET TO FEED THE WORMS. THERE ARE ONLY A FEW FOODS THAT THE EARTHWORM WILL EAT.

TRAINING EXAMPLE

FILLER STORY

SNOW VACATION

SOME PEOPLE GO TO PLACES WHERE IT SNOWS FOR A VACATION. A SNOW VACATION CAN BE A LOT OF FUN. THERE ARE MANY THINGS TO DO. PEOPLE CAN GO SKIING OR SNOW SHOEING. IT IS ALSO FUN TO SLIDE DOWN THE HILLS. PEOPLE USE SLEDS OR INNER TUBES FOR SLIDING. THE MOUNTAINS ARE THE BEST PLACE TO GO. UP HIGH IT SNOWS A LOT. AND THE MORE SNOW THE BETTER FOR THIS VACATION.

FILLER STORY

BODY

DO YOU KNOW WHY YOU CAN SKIP, HOP, AND TWIST? YOU CAN DO THESE AND OTHER MOVEMENTS BECAUSE OF THE WAY YOUR BODY IS MADE. THE MUSCLES AND BONES IN YOUR BODY HELP YOU MOVE AROUND. THERE ARE MANY MUSCLES IN YOUR BODY. YOUR MUSCLES BEND EASILY. THEY HELP YOU TO BEND FORWARD, BACKWARD, AND SIDEWAYS. YOU HAVE LOTS OF STRONG MUSCLES. THE MUSCLES ARE FASTENED TO YOUR BONES. THE MUSCLES FASTENED TO YOUR BACKBONE HELP TO HOLD YOU UP. THERE ARE MANY THINGS TO LEARN ABOUT YOUR BODY.

FILLER STORY

BRIDGE

KATE SHELLY IS THE NAME OF A RAILROAD BRIDGE. IT WAS BUILT IN HONOR OF A LITTLE GIRL. ONE NIGHT KATE HEARD A TRAIN WHISTLE. IT WAS RAINING VERY HARD. SHE SAW THAT THE RAILROAD BRIDGE WAS WASHED AWAY. THE BRIDGE HAD FALLEN INTO THE RIVER. SHE RAN OUT TO THE TRACK IN FRONT OF THE BRIDGE AND WAVED A LIGHT. THIS STOPPED THE TRAIN BEFORE IT WENT OVER THE BRIDGE INTO THE RIVER. LATER A NEW BRIDGE WAS BUILT. THE BRIDGE WAS NAMED FOR KATE.

FILLER STORY

BUTTONS

PEOPLE OFTEN SAVE OR COLLECT THINGS FOR A HOBBY. BUTTON COLLECTING IS ONE KIND OF HOBBY. SOME PEOPLE JUST SAVE OLD BUTTONS. OTHERS LIKE TO SAVE NEW ONES. BUTTONS CAN BE MADE OUT OF MANY DIFFERENT MATERIALS. AND BUTTONS CAN BE MANY COLORS. SOME BUTTONS ARE VERY LARGE AND OTHERS ARE VERY SMALL. SOME EVEN HAVE PICTURES ON THEM. THERE ARE MANY DIFFERENT KINDS OF BUTTONS. THAT IS WHAT MAKES BUTTON COLLECTING SO MUCH FUN.

FILLER STORY

COCOA BEAN

DID YOU KNOW THAT CHOCOLATE IS MADE FROM A BEAN? THE BEAN IS CALLED A COCOA BEAN." THE COCOA BEAN IS GROWN IN AFRICA. THE BEAN GROWS ON A SMALL TREE. COCOA BEANS ARE PICKED BY HAND. THE BEANS ARE PLACED IN THE SUN TO DRY OUT. WHEN THE BEANS ARE DRY THEY ARE GROUND INTO COCOA POWDER. THIS POWDER CAN BE USED IN MANY WAYS. IT CAN BE MIXED IN MILK TO MAKE CHOCOLATE MILK.

FILLER STORY

COINS

THE COINS WE USE TODAY LOOK DIFFERENT FROM THOSE USED IN THE PAST. IT IS INTERESTING TO SEE HOW OUR COINS HAVE CHANGED. THE PICTURES ON THE COINS HAVE CHANGED. SO HAVE THE WRITINGS ON THE COINS. SOME OLD COINS ARE WORTH A LOT OF MONEY. FOR EXAMPLE, SOME OLD PENNIES HAVE INDIAN HEADS ON THEM. NOW THOSE PENNIES ARE WORTH MORE THAN ONE CENT. YOU SHOULD LOOK CLOSELY AT YOUR COINS. WHO KNOWS, YOUR OLD COINS MAY BE WORTH MORE THAN YOU THOUGHT.

FILLER STORY

FEATHERS

INDIAN MEN WEAR HEADBANDS MADE OF FEATHERS. THE FEATHERS TELL THINGS ABOUT THE MEN. THE COLORS OF THE FEATHERS AND THE WAY THEY ARE WORN ARE IMPORTANT. EACH COLOR MEANS SOMETHING. THE FEATHERS CAN BE WORN STRAIGHT UP OR HANGING DOWN. THESE THINGS TELL WHAT AN INDIAN DID IN BATTLE. FEATHERS ARE LIKE MEDALS. THE MAN HAS TO EARN THE RIGHT TO WEAR THEM. A BRAVE MAN CAN WEAR HIS FEATHERS STRAIGHT UP. WHEN AN INDIAN GETS HURT IN BATTLE HE GETS TO WEAR A RED FEATHER.

FILLER STORY

FLYING BELT

HOW WOULD YOU LIKE TO ZIP THROUGH THE AIR LIKE A BIRD? THE U. S. ARMY IS TESTING A BELT THAT WILL LET PEOPLE FLY. YOU CANNOT BUY THE BELT YET. THE FLYING BELT IS REALLY A ROCKET BELT. IT FITS ON YOUR BACK. A SMALL TANK HOLDS GAS. THE GAS TURNS TO STEAM WHEN A BUTTON IS PRESSED. THEN THE STEAM PUSHES ON THE GROUND. THIS PUSH OF STEAM WILL SEND YOU UP INTO THE AIR. THE FLYING BELT WILL TAKE YOU UP ABOUT AS HIGH AS A TALL TREE. TO LAND SAFELY, YOU MUST SLOWLY CUT OFF THE FLOW OF STEAM.

FILLER STORY

OCTOPUS

AN OCTOPUS IS A STRANGE LOOKING OCEAN ANIMAL. THE BODY OF AN OCTOPUS IS MAINLY A HUGE HEAD. THERE ARE TWO BIG EYES ON ITS HEAD. EIGHT ARMS COME OUT OF THE HEAD. THESE ARMS HELP THE OCTOPUS TO SWIM. IT CAN SWIM VERY FAST. THE OCTOPUS HAS A SPECIAL WAY TO HIDE FROM ITS ENEMIES. IT CHANGES THE COLOR OF ITS BODY. THE COLOR CHANGE HELPS THE OCTOPUS TO BLEND INTO THE ROCKS OR SAND. THIS MAKES IT HARD FOR DIVERS AND OTHER FISH TO FIND THE OCTOPUS.

FILLER STORY

NEWS

THE PEOPLE WHO TELL US THE NEWS ARE NEWS BROADCASTERS. THEIR JOB IS TO TELL US WHAT IS GOING ON IN THE WORLD. HOW DOES A BROADCASTER KNOW SO MUCH? THEY GO OUT AND TALK TO PEOPLE. THERE ARE MANY BROADCASTERS. THEY ALL SEND IN THE NEWS THEY LEARN TO RADIO AND TV STATIONS. ALL OF THE NEWS GOES IN A MACHINE CALLED A WIRE. THIS MACHINE PRINTS OUT THE NEWS ON PAPER. THEN THE BROADCASTERS AT EACH STATION READ THE NEWS ON THE WIRE. THEY CHOOSE THE NEWS TO TALK ABOUT FOR THAT DAY.

FILLER STORY

ROOTS

MANY PLANTS HAVE ROOTS THAT GROW INTO THE GROUND. THE ROOTS SPREAD OUT AS THEY GROW. THE ROOTS CAN GROW AROUND STONES IN THE GROUND. PLANTS GET WATER FROM THEIR ROOTS. ROOTS ACT LIKE SPONGES. THEY SOAK UP THE WATER IN THE GROUND. THE ROOTS GROW DOWN TOWARDS DAMP PLACES TO GET THE WATER. ROOTS ALSO HELP TO PROTECT THE PLANT. THE ROOTS HOLD THE PLANT IN PLACE. THE ROOTS HOLD THE PLANT IN THE GROUND WHEN IT IS WINDY.

FILLER STORY

RUBBER

MUCH OF THE RUBBER WE USE COMES FROM THE RUBBER TREE. THESE TREES DO NOT GROW IN OUR COUNTRY. RUBBER COMES FROM THE JUICE WHICH FLOWS IN THE TREES. THE JUICE LOOKS WHITE LIKE MILK. BUT IT IS VERY THICK AND STICKY. THE JUICE IS COLLECTED FROM THE TREE. THE JUICE IS TAKEN BY CUTTING A HOLE INTO THE BARK OF THE TREE. THEN A SMALL METAL PIPE IS PUT INTO THE HOLE. THE JUICE FLOWS OUT OF THE PIPE INTO A PAIL PLACED UNDER THE PIPE. IT COMES OUT VERY SLOWLY BECAUSE IT IS SO THICK. THE JUICE FLOWS ONLY FOR AN HOUR AFTER THE TREE IS CUT.

FILLER STORY

VENUS-FLYTRAP

THE PLANT CALLED A VENUS-FLYTRAP CATCHES INSECTS. THIS PLANT WORKS JUST LIKE A TRAP. EACH LEAF CAN FOLD IN HALF. AROUND THE EDGE OF THE LEAF ARE LITTLE CLAWS. WHEN THE LEAF FOLDS IN HALF THE CLAWS LOCK TOGETHER. ON EACH LEAF THERE ARE LITTLE HAIRS. WHEN THE HAIR MOVES THE PLANT WILL FOLD INTO THE TRAP. AN INSECT LANDS ON AN OPENED LEAF. WHEN THE INSECT MOVES THE HAIRS ON THE LEAF MOVE TOO. THEN THE LEAF CLOSES AND TRAPS THE INSECT.

Appendix B

Multiple Choice Opposite Test
Used in Pilot Study 3

NAME ______________________________

GRADE ______________

DATE ______________

EXAMPLE

THEY ARE BIG THINGS.

A) THEY ARE BRIGHT THINGS,
B) THEY ARE SMALL THINGS
C) THEY ARE PRETTY THINGS.

NAME ____________________

MULTIPLE CHOICE TEST OF OPPOSITES

1. I HAVE LEARNED IT.
   - A. I DO NOT EAT IT.
   - B. I DO NOT KNOW IT.
   - C. I DO NOT PICK IT.

---

2. I DO NOT HAVE IT.
   - A. I AM WANTING IT.
   - B. I AM SMELLING IT.
   - C. I AM USING IT.

---

3. THAT IS HIGH UP.
   - A. THAT IS AT THE STORE.
   - B. THAT IS AT THE BOTTOM
   - C. THAT IS AT THE TOP.

---

4. IT IS POPULAR
   - A. IT IS NOT WELL LIKED.
   - B. IT IS NOT HOT.
   - C. IT IS NOT VERY BIG.

NAME ____________________

9. They take risks.
    - A. They never get paid.
    - B. they never take chances.
    - C. They never take things.

10. It is far away.
    - A. It is near.
    - B. It is above.
    - C. It is distant.

11. There is no cooking for it.
    - A. It needs to be cut.
    - B. It needs a lot of water.
    - C. It needs to be baked.

12. There is no light.
    - A. There are hiding places.
    - B. There are rays from the sun.
    - C. There are many fish.

NAME ____________________

5. IT IS CROWDED.
   - A. IT IS COLD.
   - B. IT IS EMPTY.
   - C. IT IS FULL.

---

6. IT PREVENTS SOMETHING.
   - A. IT DOES NOT STOP SOMETHING.
   - B. IT DOES NOT EAT SOMETHING.
   - C. IT DOES NOT PLAY SOMETHING.

---

7. THIS IS FROZEN.
   - A. THIS IS ICY.
   - B. THIS IS SHORT.
   - C. IHIS IS MELTED.

---

8. IT CANNOT SEE.
   - A. IT CAN LOOK
   - B. IT CAN FLY.
   - C. IT CAN TALK.

NAME ____________________

13. I EAT MOST FOODS.
    - A. I EAT MANY FOODS.
    - B. I EAT SWEET FOODS.
    - C. I EAT A FEW FOODS.

---

14. IT LISTENS FOR NOISES.
    - A. IT CANNOT LIVE.
    - B. IT CANNOT HEAR.
    - C. IT CANNOT EAT.

---

15. IT IS DIRTY.
    - A. IT IS CLEAN.
    - B. IT IS HARD.
    - C. IT IS MESSY.

---

26. IT GROWS SLOWLY.
    - A. IT GROWS FULLY.
    - B. IT GROWS THINLY.
    - C. IT GROWS QUICKLY.

NAME____________________

17. IT IS RAINY.
    - A. IT IS WET.
    - B. IT IS DRY.
    - C. IT IS OLD.

---

18. THIS IS CHEAP.
    - A. THIS IS EXPENSIVE.
    - B. THIS IS VERY GOOD.
    - C. THIS IS LOW COST.

---

19. I AM NOT ABLE TO GRAB IT.
    - A. I CAN FIND IT.
    - B. I CAN FEED IT.
    - C. I CAN CATCH IT.

---

20. THIS IS HARD.
    - A. THIS IS LITTLE.
    - B. THIS IS SOFT.
    - C. THIS IS STRONG.

NAME____________________

21. I AM NOT AFRAID
    - A. I GET PAID.
    - B. I GET SCARED.
    - C. I GET NEAR.

---

22. IT IS NIGHT.
    - A. IT IS PINK.
    - B. IT IS DARK.
    - C. IT IS DAY.

---

23. THIS IS FUZZY.
    - A. THIS IS BIG.
    - B. THIS IS BLURRY.
    - C. THIS IS CLEAR.

---

24. THIS IS HEATED.
    - A. THIS IS NOT SAFE.
    - B. THIS IS NOT SMALL
    - C. THIS IS NOT WARM.

Appendix C

Titles of Error Passages Used
at the Pre, Immediate and Delay
Test for Twelve Test Packets

PACKET NUMBER	PRE-TEST	IMMEDIATE TEST	DELAY TEST
1	Iceberg Ireland Stunt People Rat	Worm Journal Oyster Hummingbird	Diamonds Houses Camp Fish
2	Iceberg Ireland Stunt People Rat	Diamonds Houses Camp Fish	Worm Journal Oyster Hummingbird
3	Iceberg Journal Camp Fish	Worm Ireland Oyster Hummingbird	Diamonds Houses Stunt People Rat
4	Iceberg Houses Oyster Hummingbird	Diamonds Journal Stunt People Fish	Work Ireland Camp Rat
5	Worms Houses Camp Fish	Iceberg Journal Stunt People Rat	Diamonds Ireland Oyster Hummingbird
6	Worms Ireland Camp Rat	Iceberg Houses Oyster Fish	Diamonds Journal Stunt People Hummingbird

PACKET NUMBER	PRE-TEST	IMMEDIATE TEST	DELAY TEST
7	Worms Houses Stunt People Fish	Diamonds Ireland Camp Hummingbird	Iceberg Journal Oyster Rat
8	Worms Journal Oyster Hummingbird	Diamonds Houses Stunt People Rat	Icebergs Ireland Camp Fish
9	Diamonds Ireland Oyster Fish	Worms Journal Camp Rat	Iceberg Houses Stunt People Hummingbird
10	Diamonds Journal Camp Rat	Worms Houses Stunt People Hummingbird	Iceberg Ireland Oyster Fish
11	Diamonds Houses Oyster Hummingbird	Iceberg Ireland Camp Fish	Worms Journal Stunt People Rat
12	Diamonds Journal Stunt People Hummingbird	Iceberg Ireland Oyster Rat	Worms Houses Camp Fish

Appendix D

Instructional Scripts for the Three Training Conditions

Instructional Script for the Control Didactic Condition

Opening

I need your help on some other stories today. Remember last week you judged some stories to see if you thought they were easy to understand. And if there were any problem parts you underlined them, but if there were no problem parts you did not underline anything. Well, this time I want you to judge some stories again. I will show you how to do this. We will practice with two stories then you will read and judge the other stories I wrote. OK? Any questions?

First Presentation

Step 1 (Experimenter Reads)

So here is the first practice story. I will tell you what to do.

a) You should read the first two sentences and stop so I can tell you what to do. (Read 2 sentences; put hand over rest of story.)

b) OK, you need to be finding problems. Like if there is something people might have trouble understanding.

c) Good work (Name). Now you should read the whole story from the beginning. (Read the story and look up).

d) Did you find any problems?

e) If example passage is "Suzie" say: There is a problem part because here it says "Because Suzie is a big girl she gets to do more." So, you should underline the sentence that has the problem. The confusing part here is "Suzie is a big girl."

Or

If example passage is "Vacation" say: After reading this you could say there are no problems because the story is easy to understand and there are no confusing parts so you would not need to underline anything in this story.

Step 2. (Child reads outloud.)

OK, now I want you to read this same story. I'll tell you the instructions again. (Read instructions a-e to child.)

Step 3. (Child whispers story.)

You are doing a great job. Now practice again with this story. Only this time whisper the story to yourself. (Read instructions a-e.)

Step 4. (Child reads story silently.)

You are really doing great. Now you will practice with this story once more. But this time read the story silently to yourself. (Read instructions a-e.)

Second Presentation

Good, you are getting the idea of using the instructions. We will practice with another story now. I will tell you what to do.

(Repeat Steps 1-4 with the second example passage.)

Instructional Script for the Neutral Self-Instruction Condition

Opening

I need your help on some other stories today. Remember last week you judged some stories to see if you thought they were easy to understand. And if there were any problem parts you underlined them, but if there were no problem parts you did not underline anything. Well, this time I want you to judge some stories again. But first I will give you some special thinking instructions. Next we will practice with two stories. You will watch me, then we will practice together. Finally, you will practice all by yourself before you read and judge the other stories I wrote. OK? Any questions?

First Presentation

Step 1 (Experimenter Models)

So here is the first practice story. I want you to watch as I give myself the special thinking instructions to use.

a) I will read the first two sentences and then stop to think about what to do. (Read 2 sentences, put hand over rest of story.)

b) I need to think of finding problems. Like if there is something people might have trouble understanding.

c) Good work (Name). Now I will read the whole story from the beginning. (Read the story and look up.)

d) Did I find any problems? (Put hand over story while thinking.)

e) If example passage is "Suzie" say: There is a problem part because here it says "Because Susie is a big girl she gets to do more." So I will underline the sentence that has the problem. The confusing part here is "Suzie is a big girl".

Or

If example passage is "Vacation" say: After reading this I would say there are no problems because the story is easy to understand and there are no confusing parts so I would not need to underline anything in this story.

Step 2 (Experimenter and child practice self-statements out loud)

OK, now I want you to practice with me on this same story. We will say all of the instructions out loud together so you can learn to use them completely as thinking instructions to yourself. (Give self-statements a - e)

Step 3 (Child whispers self-statements)

You are doing a great job. Now practice all of these instructions again with this story. Only this time whisper them to yourself.

(Give self-statements a - e)

Step 4 (Child covertly uses self-statements)

You are really doing great, Now you will practice with this story once more. But this time say the instructions silently to yourself. Think of all the instructions to yourself but read the story out loud. You can show me you are using the instructions by using your hands to cover the story when you are thinking. (Give self-statements a - e).

Second Presentation

Good, you are getting the idea of using thinking instructions. We will practice with another story now. First listen and watch me as I read this story using thinking instructions.

(Repeat Steps 1 - 4 with the second example passage.)

Instructional Script for the Specific Self-Instruction Condition

Opening

I need your help on some other stories today. Remember last week you judged some stories to see if you thought they were easy to understand? And if there were any problem parts you underlined them, but if there were no problem parts you did not underline anything. Well, this time I want you to judge some stories again. But first I will give you some special thinking instructions. Next, we will practice with two stories. You will watch me, then we will practice together. Finally, you will practice all by yourself before you read and judge the other stories I wrote. OK? Any questions?

First Presentation

Step 1 (Experimenter models)

So here is the first practice story. I want you to watch as I give myself the special thinking instructions to use.

a) I will read the first two sentences and then stop to think about the kind of problem to look for. (Read 2 sentences, put hand over rest of story.)

b) I need to think about finding ideas that are the opposite of each other. Like if one sentence in the story says one thing and then later another sentence says something opposite.

c) Good work (Name). Now I will read the whole story from the beginning. (Read the whole story and look up).

d) Did I find any ideas that were the opposite of each other? (Put hand over story while thinking).

e) If example passage is "Suzie" say: There is a problem part because here it says "Because Suzie is a big girl she gets to do more. This part is opposite to the part that says "Suzie is a very tiny baby". So I will underline the sentence that has the problem. The confusing part is "Suzie is a big girl".

Or

If example passage is"Vacation" say: After reading this I would say there are no problems because the story is easy to understand and there are no parts that mean the opposite of each other. So I would not need to underline anything in this story.

Step 2 (Experimenter and child practice self-statements out loud.)

OK, now I want you to practice with me on this same story. We will say all of the instructions out loud together so you can learn to use them completely as thinking instructions to yourself. (Give self-statements a - e).

Step 3 (Child whispers self-statements)

You are doing a great job. Now practice all of these instructions again with the story. Only this time whisper them to yourself.

(Give self-statements a - e)

Step 4 (Child covertly uses self-statements)

You are really doing great. Now you will practice with this story once more. But this time say the instructons silently to yourself. Think of all the instructions to yourself but read the story out loud. You can show me you are using the instructions by using your hands to cover the story when you are thinking. (Give self-statement a - e)

Second Presentation

Good, you are getting the idea of using thinking instructions. We will practice with another story now. First listen and watch me as I read this story using thinking instructions.

(Repeat Steps 1 - 4 with the second example passage).

Appendix E

Posttest Interview

Child's Name__________________

Postexperiment Interview

Before you go today I wanted to ask you a few questions.

1. While you were judging the stories today, how much did you use those thinking instructions we practiced last week?

2. (Ask children even if #1 is no.) I was wondering if you could explain to me what you did when you used the "thinking instructions?" (Let child explain freely - if child said no to #1, say try to remember from last week.)

Check here
if mentioned

___a) Tell myself to read first 2 sentences and stop.

___b) Then tell myself to find problems (opposites).

___c) Give example to self (like if there is. . . .)

___d) Tell myself good work.

___e) Tell myself to read whole story.

___f) When finished ask myself if I found any problems (opposites)

(Tell all steps to all children after this question)

3. How did you feel about using those instructions?

4. Can you think of some times when you could use these kind of instructions? (or what types of things could you be doing when you use these instructions?)

5. a) Tell me how you felt about judging the stories.

b) Did you feel uncomfortable or bad about telling me when there were problems with stories?____________________

6. a) Can you please explain to me what an opposite is?

b) Can you give me an example of opposite ideas?____________

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